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Volume XVI

Number 7

Announcement of the Thirty-Fourth

Summer Session

1925

July 6—August 14

Ithaca, New York
Published by the University
March 1, 1925

ANNOUNCEMENT OF THE SUMMER SESSION

This pamphlet is designed to give prospective students complete information about the Summer Session of Cornell University. On the last page there is a list of other publications which describe the courses of study offered during the regular academic year by the several colleges and schools of the University.

SUMMER SESSION OF THE COLLEGE OF LAW

See page 46 for information about the summer courses in Law to be given at Cornell University in 1925.

THE SUMMER SCHOOL OF BIOLOGY

See page 47 for information about the summer courses in Biology to be given at Cornell University in 1925.

THE SUMMER SCHOOL OF AGRICULTURE

See page 53 for information about the summer courses in Agriculture to be given at Cornell University in 1925.

OFFICE AT GOLDWIN SMITH 121

The office of the Summer Session is in Room 121, Goldwin Smith Hall. This office will be open as a bureau of information on registration day from 9 A. M. till 1 P. M. and from 2 till 5 P. M., and thereafter, throughout the session, daily except Saturday from 9 till 12:30 and from 2 till 4.

Members of the staff of instruction may be consulted at their offices on Monday, July 6.

THE SESSION MUST BEGIN PROMPTLY

In order to get the full number of exercises announced for the session, it is necessary that all work begin promptly on Tuesday morning, July 7. Students are urged to reach Ithaca in time to be present at the first exercise of each class. If possible, the student should register on Monday, July 6; if not, then on Tuesday, July 7, in an hour not occupied by class work.

THE CALENDAR

SUMMER SESSION OF 1925

THE FIRST TEN DAYS

July 6, Monday, 8 A. M.—5 P. M.	Registration, <i>Room A, Goldwin Smith Hall.</i>
July 7, Tuesday	Instruction begins at the time and place announced for each course. Registration is continued in the Registrar's Office, <i>Morrill Hall.</i>
July 7, Tuesday evening	Organ Recital, <i>Sage Chapel.</i>
July 8, Wednesday evening	Departmental Lectures and Conferences.
July 9, Thursday evening	Piano Recital, Professor Otto Kinkeldey.
July 10, Friday, until 4 P. M.	Last day for payment of fees at the Treasurer's office, <i>1 Morrill Hall.</i>
July 11, Saturday	Five-hour classes meet as usual on this first Saturday.
July 12, Sunday, 11 A. M.	Public Worship and Sermon in <i>Sage Chapel.</i>
July 12, Sunday Evening	Organ Recital, <i>Bailey Hall.</i>
July 13, Monday evening	Lecture Course, <i>Barnes Hall.</i>

THE REGULAR WEEKLY SCHEDULE

Sunday, 11 A. M.	Public Worship and Sermon, <i>Sage Chapel.</i> (Beginning July 12.)
Sunday evening,	Organ Recital, <i>Bailey Hall.</i> (Beginning July 12.)
Monday evening,	Lecture Course, <i>Barnes Hall.</i> (Beginning July 13.)
Tuesday evening,	Organ Recital, <i>Sage Chapel.</i> (Beginning July 7.)
Wednesday evening,	Departmental Lectures and Conferences. (Beginning July 8.)
Thursday evening,	Piano Recital, Professor Kinkeldey. (Beginning July 9.)
Friday evening,	Plays by Summer Theater Company. (Beginning July 10.)
Saturday evening,	Plays by Summer Theater Company. (Beginning July 11.)

CONCERTS

July 17, Friday evening:	Concert. <i>Bailey Hall.</i> Artist to be announced.
July 31, Friday evening:	Concert. <i>Bailey Hall.</i> Artist to be announced.

THE LAST DAY

August 14, Friday	Summer Session ends.
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THE WEEKLY CALENDAR

The WEEKLY CALENDAR of the University carries announcements of all public exercises held in connection with the Summer Session. It is posted on the bulletin boards.

THE SUMMER SESSION OF 1925

OFFICERS

The President of the University

LIVINGSTON FARRAND, A.B., M.D., L.H.D., LL.D.

ADMINISTRATIVE BOARD

Executive Committee

RIVERDA HARDING JORDAN, Ph.D., *Chairman*

BENTON SULLIVAN MONROE, Ph.D., *Secretary*

ROLLINS ADAMS EMERSON, D.Sc., *Dean of the Graduate School*

DEXTER SIMPSON KIMBALL, M.E., *Dean of the College of Engineering*

ROBERT MORRIS OGDEN, Ph.D., *Dean of the College of Arts and Sciences*

GEORGE ALAN WORKS, Ph.B., M.S.A., *Director, Summer School of Agriculture*

The Registrar

DAVID FLETCHER HOY, M.S.

The Dean of Women

GEORGIA LAURA WHITE, Ph.D.

STAFF OF INSTRUCTION

(The names of the instructors in the Summer School in Agriculture are printed on page 53; those of the instructors in the Summer Session of the College of Law, on page 46; those of the instructors in the Summer School of Biology, on page 47.)

ALFRED WILLIS ABRAMS, Ph.B. Education
(Chief, Visual Instruction Division, New York State Department of Education)

BRISTOW ADAMS, B.A. Drawing and Painting
(Professor in the Extension Service)

GEORGES BALLY, Licencié ès Lettres. French
(French Master, Culver Military Academy)

HARRY ELMER BARNES, Ph.D. Sociology
(Professor of Historical Sociology, Smith and Amherst Colleges)

CARL BECKER, Ph.D. History
(Professor of Modern European History)

BEN RAYMOND BEISEL. Mathematics
(Instructor in Mathematics)

HERBERT CLIFFORD BELL, Ph.D. History
(Professor of History and Political Science, Bowdoin College)

HYMAN CHONON BERKOWITZ, Ph.D. Spanish
(Instructor in Romance Languages, University of Wisconsin)

CHARLES CLARENCE BIDWELL, Ph.D. Physics
(Assistant Professor of Physics)

FREDERICK LOVELL BIXBY, A.B. Psychology
(Instructor in Psychology)

ALBERT WILHELM BOESCHE, Ph.D. German
(Professor of German)

SAMUEL LATIMER BOOTHROYD, B.S. Astronomy
(Professor of Astronomy and Geodesy)

WILLIAM KENNETH BOYD, Ph.D. History
(Professor of History, Trinity College, Durham, N. C.)

THOMAS ROLAND BRIGGS, Ph.D.	Chemistry
(Assistant Professor of Physical Chemistry and Electro-Chemistry)	
LILLIAN FRED BROTHERHOOD, A.M.	Geology
(Teacher, National Park Seminary, Washington, D. C.)	
ROBERT MARSHALL BROWN, A.M.	Geology
(Professor of Geology, Rhode Island State College, and of Geology and Economic Geography, Rhode Island College of Education)	
ARTHUR WESLEY BROWNE, Ph.D.	Chemistry
(Professor of Inorganic and Analytical Chemistry)	
EARLE NELSON BURROWS, M.C.E.	Structural Engineering
(Assistant Professor of Structural Engineering)	
WALTER BUCKINGHAM CARVER, Ph.D.	Mathematics
(Assistant Professor of Mathematics)	
PERCIVAL LEMON CLARK, jr., A.B.	Economics
(Instructor in Economics)	
JACOB ROLAND COLLINS, Ph.D.	Physics
(Assistant Professor of Physics)	
ROBERT BRAINARD COREY, B.Chem.	Chemistry
(Instructor in Chemistry)	
WALTER RODNEY CORNELL, B.S.	Mechanics
(Assistant Professor of the Mechanics of Engineering)	
RALPH THOMAS KLINE CORNWELL, B.Chem.	Chemistry
(Instructor in Chemistry)	
LOUISE COURTOIS, A.M.	French
(Instructor in French, Lincoln School, New York City)	
CLYDE FIRMAN CRAIG, Ph.D.	Mathematics
(Assistant Professor of Mathematics)	
ROBERT EUGENE CUSHMAN, Ph.D.	Government
(Professor of Government)	
CHARLES ELIJAH DECKER, Ph.D.	Geology
(Professor of Geology, University of Oklahoma)	
CHARLES LOVE DURHAM, Ph.D., Litt.D.	Latin
(Professor of Latin)	
DONALD ENGLISH, B.S., M.B.A.	Economics and Accounting
(Professor of Economics and Accounting)	
Dr. JENNETTE EVANS.	Hygiene
(Assistant Professor of Hygiene and Medical Adviser of Women)	
SAMUEL FELDMAN.	Psychology
(Assistant in Psychology)	
FREDERICK EBELL FISKE, Ph.D.	English
(Assistant Professor of English)	
O. REX FORD, B.S., M.A.	Physics
(Instructor in Physics)	
CLARA LOUISE GARRETT, B.S.	Drawing
(Assistant Professor of Drawing)	
SEYMOUR STANTON GARRETT, C.E.	Mechanics of Engineering
(Professor of Mechanics of Engineering)	
JEAN M. GELAS.	Physical Education
(Instructor in Physical Education, Hamilton College)	
SIDNEY GONZALES GEORGE, C.E.	Mechanics
(Professor of Mechanics)	
ROSWELL CLIFTON GIBBS, Ph.D.	Physics
(Professor of Physics)	

ARTHUR WARD GILBERT, B.S.	Education
(Instructor in Education)	
GASTON GILLE, Cert. Péd.	French
(Haverford College)	
DAVID CLINTON GILLESPIE, Ph.D.	Mathematics
(Assistant Professor of Mathematics)	
CLARENCE TRUMAN GRAY, Ph.D.	Rural Education
(Associate Professor of Education, University of Texas)	
GUY SHEPARD GREENE, A.B.	English
(Instructor in English)	
WILLIAM ALEXANDER HAMMOND, Ph.D.	Philosophy
(Sage Professor of Ancient Philosophy and of Aesthetics)	
ROBERT HANNAH, A.M.	Public Speaking
(Instructor in Public Speaking)	
GEORGE MCLEAN HARPER, Ph.D.	English
(Professor of English Literature, Princeton University)	
WALTER D. HEAD.	French
(Headmaster, Nichols School, Buffalo, N. Y.)	
JOHN WILLIAM HEBEL, Ph.D.	English
(Assistant Professor of English)	
EMILY HICKMAN, Ph.D.	History
(Professor of History, Wells College)	
LOUIS BENJAMIN HOISINGTON, Ph.D.	Psychology
(Assistant Professor of Psychology)	
ERIC VAIL HOWELL, M.C.E.	Mechanics
(Instructor in Mechanics)	
HOULDER HUDGINS.	Economics
(Instructor in Economics and Accounting)	
HOYT HOPEWELL HUDSON, Ph.D.	Rural Social Organization
(Assistant Professor of English and Public Speaking, Swarthmore College)	
EDWARD WESLEY HUGHES.	Chemistry
(Assistant in Chemistry)	
LEE SISSON HULTZEN.	Public Speaking
(Assistant Professor of Public Speaking, Washington University, St. Louis, Mo.)	
EVERETT LEE HUNT, A.B.	Public Speaking
(Assistant Professor of Public Speaking)	
HOWARD LOUIS HUNTER.	Chemistry
(Assistant in Chemistry)	
WALLIE ABRAHAM HURWITZ, Ph.D.	Mathematics
(Professor of Mathematics)	
JOHN IRWIN HUTCHINSON, Ph.D.	Mathematics
(Professor of Mathematics)	
WALTER WOODBURN HYDE, Ph.D.	History
(Professor of Greek, University of Pennsylvania)	
CHARLES HENRY JOHNSON, A.B., M.A.	Chemistry
(Assistant in Chemistry)	
WILLIS ERNEST JOHNSON, Ph.D.	Education
(Director of Education, State Teachers College, San Diego, California)	
RIVERDA HARDING JORDAN, Ph.D.	Education
(Professor of Education)	
JOHN CALVIN KELLER, B.S.	Chemistry
(Assistant in Chemistry)	
MYRON SLADE KENDRICK, A.M.	Economics
(Assistant Professor of Economics)	

RALPH HAYWARD KENISTON, Ph.D.	Romance Languages
(Professor of Romance Languages)	
EARLE HESSE KENNARD, Ph.D.	Physics
(Assistant Professor of Physics)	
W. R. KINGERY	Romance Languages
(Instructor in Romance Languages)	
OTTO KINKELDEY, Ph.D.	Music
(Professor of Music)	
HAROLD TALBOT LACEY, B.Chem.	Chemistry
(Assistant in Chemistry)	
HENRY LEIGHTON, A.B.	Geology
(Professor of Geology, University of Pittsburgh)	
ASA EMANUEL MCKINNEY, Ph.D.	Chemistry
(Instructor in Chemistry)	
CLYDE WALTER MASON, Ph.D.	Chemistry
(Instructor in Chemistry)	
JAMES FREDERICK MASON, Ph.D.	French
(Professor of the Romance Languages and Literatures)	
PIERRE MERTZ, A.B.	Physics
(Instructor in Physics)	
BENTON SULLIVAN MONROE, Ph.D.	English
(Assistant Professor of English)	
CLYDE B. MOORE, Ph.D.	Education
(Professor of Education, University of Pittsburgh)	
MARCEL MORAUD, Agrégé	French
(Associate Professor of French, University of Toronto)	
JAMES FREDERICK MOUNTFORD, Litt.D.	Classics
(Professor of Classics)	
GUY BROOKS MUCHMORE, A.B.	Public Speaking
(Assistant Professor of Public Speaking)	
MELVIN L. NICHOLS, B.Chem., Ph.D.	Chemistry
(Assistant Professor of Chemistry)	
CLARK SUTHERLAND NORTHUP, Ph.D.	English
(Professor of English and Librarian of the Hart Memorial Library)	
ROBERT MORRIS OGDEN, Ph.D.	Education
(Professor of Education and Dean of the College of Arts and Sciences)	
FREDERICK WILLIAM OWENS, Ph.D.	Mathematics
(Assistant Professor of Mathematics)	
MILES ALBION POND, Ph.B.	Descriptive Geometry
(Assistant Professor of Civil Engineering)	
PAUL RUSSEL POPE, Ph.D.	German
(Professor of German)	
HILLEL PORITSKY, A.B.	Mathematics
(Instructor in Mathematics)	
HAROLD LYLE REED, Ph.D.	Economics
(Professor of Economics and Finance)	
DONALD EVERETT RICHMOND, A.B., M.S.	Mathematics
(Instructor in Mathematics)	
FRED STILLMAN ROGERS, M.E.	Kinematics
(Assistant Professor of Machine Design)	
ERNEST WILLIAM SCHODER, Ph.D.	Hydraulics
(World War Memorial Professor of Experimental Hydraulics)	
HARRY W. SEITZ	Music
(Supervisor of Music, High Schools, Kansas City, Mo.)	

FRANCIS ROBERT SHARPE, Ph.D.	Mathematics
(Professor of Mathematics)	
HAROLD CONWAY SHAUB, M.A.	Mathematics
(Instructor in Mathematics)	
DEAN FRANKLIN SMILEY, M.D.	Hygiene
(Assistant Professor of Hygiene and Medical Adviser)	
HAROLD D. SMITH, A.B., Mus.D.	Music
(Assistant Professor of Music)	
VIRGIL SNYDER, Ph.D.	Mathematics
(Professor of Mathematics)	
WALTER KING STONE	Drawing and Painting
(Assistant Professor of Drawing)	
WILLIAM STRUNK, jr., Ph.D.	English
(Professor of English)	
FRANK THILLY, Ph.D., LL.D.	Philosophy
(Professor of Philosophy)	
CHARLES KENNETH THOMAS, A.B.	Public Speaking
(Instructor in Public Speaking)	
EDWARD BRADFORD TITCHENER, Ph.D., LL.D., D.Sc., Litt.D.	Psychology
(Sage Professor of Psychology in the Graduate School, Lecturer in Psychology)	
CLARENCE ELLSWORTH TOWNSEND, M.E.	Mechanical Drawing
(Professor of Drawing in the College of Engineering)	
CARL WILLIAM TUCKER, B.S., M.S.	Chemistry
(Assistant in Chemistry)	
FORREST GLENN TUCKER, Ph.D.	Physics
(Assistant Professor of Physics)	
LEONARD CHURCH URQUHART, C.E.	Structural Engineering
(Assistant Professor of Structural Engineering)	
MARJORIE D. VAN ORDER	Geology
(Assistant in Geology)	
J. FRANCISCO DE VILLAFRANCA	Spanish
(Teacher of Spanish, Meriden High School, Meriden, Conn.)	
OSCAR DIEDRICH VON ENGELN, Ph.D.	Geography and Geology
(Professor of Physical Geography)	
SETH WAKEMAN, Ph.D.	Education
(Assistant Professor of Education)	
HARRY PORTER WELD, Ph.D.	Psychology
(Professor of Psychology)	
HERBERT AUGUST WICHELNS, Ph.D.	Public Speaking
(Assistant Professor of Public Speaking)	
LAVERNE HAROLD WILLISFORD, B.S.	Chemistry
(Assistant in Chemistry)	
KARL ABELL ZELLER, Ph.B., A.M.	Physics
(Principal of High School, Niles, Ohio)	

OBJECT OF THE SESSION

INSTRUCTION ADAPTED TO VARIOUS NEEDS

The primary object of the Summer Session is to advance education by helping those engaged in it. The instruction is adapted to the needs of the following classes:

1. Professors and teachers in colleges and schools, superintendents, and supervisors of special branches of instruction.

The announcements of the different departments show a wide range of work. This work is either advanced and, therefore, suited to specialists who wish to pursue their individual study; or more elementary and adapted to teachers who desire to start in a new field. In addition to the instruction of the classroom, the University's libraries, museums, laboratories, and shops are open for use.

2. College students in Cornell or other universities who wish to make some scholastic use of the long vacation, especially those whose college studies may for one reason or another have been interrupted. Graduates may count some of the courses toward an advanced degree. See the *Announcement of the Graduate School* with regard to opportunities for advanced work and research during the summer.

Undergraduates may anticipate requirements and thereby shorten their course, or may make up existing deficiencies. The conditions for receiving credit, and the amount which may be obtained, are stated below, under the head of Academic Credit for Work.

3. Students entering the University and wishing to obtain surplus credit at entrance, or to complete the entrance requirements.

It often happens that students have in June more or less than the requirements for admission to college. The Summer Session affords them the opportunity either to add to their surplus and thus, in some cases, to gain a year in time; or to make up their deficiency.

4. All persons qualified to pursue with profit any course given, whether or not they are engaged in formal study or teaching.

ACADEMIC CREDIT FOR WORK

IN THE COLLEGE OF ARTS AND SCIENCES

The academic requirements for the degree of Bachelor of Arts are the completion of one hundred and twenty hours of elective work. Before graduation a student must complete six hours in each of seven specified groups of study, thirty of these hours during the first two years, under certain restrictions (the underclass requirements). During his last two years he must also elect twenty hours in some one department or group of related departments (the upperclass requirements.)

To obtain credit toward the Cornell degree by means of work done in Summer Sessions, a student must have previously satisfied the entrance requirements of the College, and must obtain in advance the Dean's approval of his selection of courses. He may then obtain

in any Summer Session credit for the number of hours he passes. To obtain credit for a term of residence he must pass a total of at least twelve hours in two or more Summer Sessions, with a minimum of four or a maximum of eight in each Session. Credit for two terms of residence, but no more, may be secured in this way.

IN OTHER COLLEGES OF THE UNIVERSITY

The nature and amount of credit allowed in other colleges at Cornell for work in the Summer Session may be learned from the statements under the announcement of each course.

IN THE GRADUATE SCHOOL

Graduate work at Cornell is not expressed in terms of courses or of hours. A graduate of any college whose requirements for a first degree are substantially equivalent to those for the first degree at Cornell may be admitted to resident study in the Graduate School. He may at once enter upon candidacy for an advanced degree if he is able to show that he has had adequate preliminary training in the subjects in which he proposes to work. The requirements for the degree do not depend primarily on the completion of any prescribed number of courses or of a fixed term of residence. They are rather based upon actual achievement in scholarship and research in the fields indicated by the major and minor subjects. The writing of a thesis and the passing of a special examination are also required. The minimum period of residence for the Master's degree is one academic year or its equivalent, and for the Doctor's degree three years.

Not all work done by a graduate student is graduate work in the strict sense of the term. Graduate work to be considered acceptable for a degree must be of advanced character in some field or department of knowledge. No residence towards a master's degree will be granted any student who does not register with the Dean of the Graduate School within three days after the opening of the Session, and who does not formally become a candidate for this degree under the direction of a special committee. The latest day for such registration in 1925 is July 10.

Students of the University Summer Session, of the Summer School of Biology, and of the Summer School in Agriculture who have been admitted to candidacy for an advanced degree are required to pay the regular tuition of the session but are exempt from tuition and administration fees in the Graduate School. On registering for the first time as candidates, students who have not previously matriculated in Cornell University will be given matriculation without payment of the usual fee on presenting a certificate that they have paid the tuition charges for the current Summer Session.

Students registered in the Graduate School and excused from tuition in the Summer School in Agriculture as residents of New York State are charged on the first registration in the Graduate School a matriculation fee of \$10, and for each session an administration fee of \$6.25.

The residence requirements for the degree of Master of Arts may be fulfilled in whole or in part by attendance during the Summer Session of the University. For this purpose, two Summer Sessions will be regarded as the equivalent of one term, and four Summer Sessions as the equivalent of one year. Candidates for this degree who are in residence during Summer Sessions only are also required to continue their studies during the year under the direction of the chairman of the special committee in charge of their work.

Any person wishing to become a candidate for an advanced degree and to study during the Summer Session is advised to write to the professor whose work he expects to take, and also to the Dean of the Graduate School, asking for a blank form of application for admission to the Graduate School. It is much better to make these arrangements before coming to Ithaca, thus avoiding delay and interruption of study after the Summer Session has begun. In this way, moreover, it may be possible to secure the advice and guidance of professors in fields of study of which no specific mention is made in the announcements. Not all departments formally offer graduate work. In some departments, notably in the Summer School of Biology, opportunities for research may be had for a longer period than the six weeks during which courses are formally conducted.

In certain departments also an invitation is issued to scholars who are beyond the stage of regular graduate study to make use of the resources of the University in these fields for carrying on research.

CERTIFICATES FOR WORK DONE

Students of the Summer Session who are not matriculated in the University may receive certificates of attendance and of work satisfactorily performed. Application for them must be made before August 15, and the applicant must leave at the office of the Registrar a large-sized envelope stamped and directed to his home address. The certificate will then be forwarded by mail. The regulations of each department for the granting of a certificate must be met.

GENERAL INFORMATION

CONDUCT AND SCHOLARSHIP

The Summer Session is conducted under the same general regulations concerning conduct and scholarship as apply during the academic year. For this reason students are requested to familiarize themselves with dormitory and other rules, and to abide by them. The officers of the University also reserve the right to cancel the registration of any student at any time for neglect of scholastic duties. The rules governing student conduct are:

"A student is expected to show both within and without the University unfailing respect for order, morality, personal honor, and the rights of others. The authority to administer this rule and to impose penalties for its violation is vested in the University Committee on Student Affairs. The rule is construed as applicable at all times, in all places, to all students of the University. A student may at any time be removed from the University if, in the opinion of the Committee on Student Affairs, his presence is not conducive to the University's best interests."

ADMISSION

There are no examinations for admission to the Summer Session. Each person must, however, satisfy the instructor in charge of every course he intends to take, unless it be elementary, that he is qualified to pursue the work.

There are some special requirements to be met by applicants for admission to the summer session of the College of Law, and such persons should consult the separate announcement of that session.

Admission to the classrooms during the Summer Session is restricted to students duly registered for the session. A student thus duly registered may occasionally visit any class; but if he wishes to attend regularly without credit he must secure special permission from the Chairman of the Summer Session. Such permission will be granted only when the student can show a serious purpose in such attendance.

If a student entering the Summer Session wishes his work to count toward a degree, there are certain regulations that he must comply with, and he will find them set forth under the head of Academic Credit for Work, page 9.

REGISTRATION

All students of the Summer Session are required to register with the Registrar of the University. The hours and places of registration are given in the Calendar of the session, on page 3. Students may register on Monday, July 6, between 8 a. m. and 5 p. m., or on the day of their arrival, if they reach Ithaca on July 7 or later. They

are urged to register on July 6. Registration before that day is not required, and it is not necessary to apply in advance for registration blanks.

Beginning on Tuesday, July 7, the Registrar's office in Morrill Hall will be open from 9 a. m. till 4 p. m. every week day except Saturday, when it will be closed at noon.

Students who wish to obtain credit for graduate work to be done during the Summer Session must register not only with the Registrar but also with the Dean of the Graduate School, at his office in Room 22, Morrill Hall.

Persons who are to take courses in the Summer School of Agriculture and in any department of the Summer Session of the University must register for both the Summer School and the Summer Session. They are required to pay only one tuition fee.

TUITION

The charge for tuition in the Summer Session of the University is fifty dollars. In the summer session of the College of Law it is sixty-five dollars for the whole session of eleven weeks, or thirty-five dollars for either term of five and one-half weeks.

The tuition fee is payable in full, on the first registration day or within the next five days, at the office of the Treasurer, Room 1, Morrill Hall.

Any student who fails to pay his tuition charges, other fees, and other indebtedness to the University, or who, if entitled to free tuition, fails to claim it at the Treasurer's office and to pay his fees and other indebtedness, within the prescribed period of grace, is thereby dropped from the University unless the Treasurer has granted him an extension of time to complete payment. The Treasurer is permitted to grant such an extension when, in his judgment, the circumstances of a particular case warrant his doing so. For any such extension the student is assessed a fee of \$5 for the first week and \$2 additional for each subsequent week in which the whole or any part of the debt remains unpaid, but the assessment in any case is not more than \$15. The assessment may be waived in any instance for reasons satisfactory to the Comptroller and the Registrar, when such reasons are set forth in a written statement.

If a student withdraws from the Summer Session, the Treasurer may refund a part of the tuition fee or cancel a part of the obligation that the student has incurred for tuition, provided the reason for the withdrawal be stated in writing and be satisfactory to the Comptroller and the Registrar. In such a case the student is required to pay twenty-five per cent of the term's tuition for each week or fraction of a week between the first registration day and the date of his certificate of withdrawal.

Students registering at any time during the last four weeks of the Summer Session or of either term of the summer session of the College of Law are required to pay for the remainder of the term at the rate of twenty-five per cent of the term's tuition for each week or fraction of a week between the date of registration and the last examination day of the term.

Any tuition fee or other fee may be changed by the Trustees to take effect at any time without previous notice.

IN THE SUMMER SCHOOL OF AGRICULTURE

Tuition in any of the courses of the Summer School of Agriculture is free to admitted students who are residents of the State of New

York and who have been residents for at least one year immediately preceding registration. *An incidental fee of ten dollars* is, however, charged to all students for admission. Students from outside the State of New York, whether they take one subject or more, are required to pay fifty dollars, in which is included the incidental fee.

Free tuition does not include instruction in the Summer School of Biology or any instruction outside the College of Agriculture, nor are students receiving free tuition permitted to attend classes outside the College of Agriculture.

OTHER FEES

In *Chemistry* a laboratory fee is charged for material actually consumed. A deposit of such amount as the instructor may prescribe must be made with the Treasurer.

In *Physics* a laboratory fee is charged at the rate of two dollars for each laboratory period each week. The entire amount must be paid to the Treasurer at the beginning of the session.

In *Geography and Geology*, in Course S 8 and in Course S 9 a fee of one dollar must be paid in advance to the Treasurer to cover incidental expenses of the course.

In *Drawing and Painting*, Course S 4, a fee of ten dollars is required.

Biology. A laboratory fee is charged for each course in Biology, varying with the character of the course. The amount which the student must expect to pay upon beginning any course is stated in the description of that course, under the head of Summer School of Biology, page 48.

Swimming. A special charge of ten dollars is made for the instruction in Swimming.

Shop-Work. Students not matriculated in the College of Engineering of Cornell University are required to pay a fee of \$3.50 for each credit hour of shop-work for which they register.

Library. A person who obtains the privilege of taking books from the University Library for home use is required to make a deposit of five dollars, which will be refunded upon the return of all books taken out.

RESIDENTIAL HALLS: ROOMS: BOARD

FOR WOMEN

The University has three residential halls for women in which rooms and board may be obtained during the Summer Session by registered students only. They are:

Sage College, which accommodates 175 persons. Here the charge for room, table board, and a specified amount of laundry, for the session, is from \$72 to \$87, according to the size and location of the room.

Prudence Risley Hall, which accommodates 184 persons. Here the charge for room, table board, and a specified amount of laundry, for the session, is from \$78 to \$87, according to the size and location of the room.

Cascadilla Hall. In this building, which accommodates about 160 persons, a furnished room may be had for the session at a cost of \$23 to \$29. The charge includes a specified amount of laundry. This building has shower baths and not tubs. On the ground floor the University conducts a cafeteria restaurant where meals can be obtained at reasonable rates.

Besides these halls, there are certain *approved houses* which are occupied exclusively by women and which, like the halls, are under the direct supervision of the Dean of Women.

Undergraduate women students of Cornell and other colleges and other women students under twenty-one years of age are expected to live in the residential halls or the approved houses. Any woman student should consult the Dean of Women before engaging a room.

In Sage College and Prudence Risley Hall, the charge for room and board includes lodging Sunday night, July 5 (not earlier), breakfast Monday, July 6, and all meals to and including breakfast Saturday, August 15.

Members of the Summer Session who lodge outside Sage College and Prudence Risley Hall may obtain table board at either of those halls for \$9 a week.

Each of the residential halls is in charge of a warden, who is glad to know the students, to advise them in illness or other emergency, and to give them whatever information they wish about the University or the town. It is understood that persons living in the halls will conform to the house regulations made for the convenience and comfort of all.

Application for rooms in any of the residential halls or approved houses for women should be made to the Manager of Residential Halls, Sage College, Ithaca, N. Y. Information about such rooms may be obtained from the Manager in advance of the application. The list of approved houses will be available after June 1st on application to the Manager, and also, if desired, a supplementary list of private houses with desirable rooms available for mature women who prefer to live outside any of the halls or approved houses. Checks should be drawn to the order of Cornell University.

A deposit of five dollars must accompany each application for a room in any of the three residential halls; otherwise the application will not be entertained. The rooms are reserved in the order of application. If a room assigned is occupied by the applicant, the amount of the deposit is held until the end of the session to cover the return of keys and any damage to building or furniture other than ordinary wear and tear, and to insure the completion of the lease. The deposit will be refunded if the applicant gives formal notice to the Manager on or before June 15 that she wishes to withdraw her application.

FOR MEN

Men attending the Summer Session can obtain comfortable and attractive rooms in the new Residential Halls for Men, which are

west of the main quadrangle, conveniently near to the other University buildings. These halls are thoroughly modern and of fireproof construction.

Application for rooms in the Residential Halls for Men, or for plans of the rooms or other information about them, should be made to the University Comptroller, Morrill Hall, Ithaca, N. Y. Checks should be drawn to the order of Cornell University.

The charge for furnished room, including care of the room and laundry of bed linen, is \$21 for the session. There are a few suites at a higher rate, and some rooms on the top floor may be had for less.

Board may be obtained for an average of \$1 to \$1.50 a day in a dining room within a hundred yards of the residential halls, which is conducted by the University on the cafeteria plan, or in other dining rooms or restaurants on or near the campus.

A list of private houses offering desirable rooms for rent for the session can be obtained after June 1st by application to the Manager of Residential Halls, Sage College, Ithaca, N. Y.

THE COST OF LIVING

An estimate of the cost of living in Ithaca in the summer can be made by consulting the figures given above. In a private house a student may be able to rent a room at a little less cost for the session than in one of the residential halls. Rooms are rented with the understanding that they will be occupied for the entire session unless both parties agree otherwise. Table board is generally engaged by the week.

MEANS OF SELF-SUPPORT

Students, either men or women, who wish to earn a part of their expenses during the session are invited to correspond in advance with the Manager of Residential Halls, Sage College, Ithaca.

THE STUDENT'S HEALTH

MEDICAL ADVICE

The University's staff includes a medical adviser of men and a medical adviser of women, and each of them has a corps of assistants. The medical advisers observe regular office hours, from 10 A. M. till 12 M. daily, at their respective offices in the Gymnasium for men and in Sage College for women. No charge is made for their services.

In cases of illness or indisposition which involve absence from classes even for one day, students are expected to report immediately either in person, by telephone, or by messenger to the medical adviser's office. For the convenience of the adviser such illness should be reported early in the day. Students indisposed but still able to attend classes should consult the medical adviser immediately in order that advice may be given and that diagnosis of incipient diseases may be made promptly. Any student failing to report as soon as possible to the medical adviser any contagious or infectious disease will be regarded as guilty of a serious breach of discipline.

A medical examination is not required of students in the Summer Session, but any student may have such an examination without charge by applying to the medical examiner.

A student may at any time be requested to withdraw from the University if, in the opinion of the University authorities, the condition of his health is such as to make it unwise for him to remain.

THE UNIVERSITY INFIRMARY

The University Infirmary occupies three large buildings near the campus. The first of these, a brownstone structure, was the home of Henry Williams Sage, for many years chairman of the Board of Trustees of the University. After his death in 1897, his sons, Dean and William Henry Sage, endowed it and gave it to the University for a students' infirmary as a memorial of their father. The second building, the Schuyler House, was purchased in 1911; in 1912 the Trustees erected a third building, fireproof, and this is the present main hospital building. The normal capacity of the Infirmary is seventy-five beds; the number can be doubled in an emergency.

The Infirmary, which is in charge of an experienced superintendent and is thoroughly equipped, provides suitable rooms, food, and nursing for sick students. It has no medical staff; students find their own physicians among practitioners in Ithaca or elsewhere.

Students in the Summer Session have all the privileges of admission to the Infirmary. They pay no fee in advance, but are liable to regular charges for services rendered.

THE LIBRARIES

The University Library is open on week days from 8 A. M. till 10:30 P. M. In this building are the main library, containing about 500,000 volumes, and most of the seminary and special libraries. The main reading room affords accommodations for more than two hundred readers, and contains a selected library of about 8,000 volumes of reference works. Below stairs is the periodical room in which are kept the current numbers of about 500 journals in various fields of knowledge. These rooms are open to all students. Students properly qualified are allowed the use of the seminary rooms and the books in them. The main collection is primarily a library of reference for use in the building. Students are, however, to a limited extent, allowed to take out books for home use. Persons wishing this privilege must make a deposit of \$5, which will be refunded upon the return of all books taken out.

The library of the College of Law numbers more than 56,000 volumes and about 5,800 pamphlets, to which generous additions are made yearly. It includes the library of the late Nathaniel C. Moak of Albany, N. Y., which was presented in 1893 by Mrs. A. M. Boardman and Mrs. Ellen D. Williams, as a memorial to Judge Douglas Boardman, the first dean of the College. In reports of the federal courts, and of the several American State jurisdictions, and in English, Scotch, Irish, Canadian, Australian, and English colonial reports, the law library is practically complete to date.

The Library of the College of Agriculture, in the basement of Stone Hall, is open on week days from 9 A. M. till 5 P. M., except Saturday, when it is closed at 1 P. M. In it will be found a large collection of bulletins and reports of experiment stations, reference books on agriculture and country life, agricultural periodicals, and the like. The entomological library, in the department of entomology on the fourth floor of Roberts Hall, is one of the most complete of its kind in the United States. Nearly all of the departments in which instruction is given have well-selected departmental libraries.

SAGE CHAPEL

Religious services are conducted in Sage Chapel throughout the academic year by clergymen of various religious denominations. There will be services in the Chapel on five Sundays during the Summer Session, July 12 to August 9 inclusive.

LECTURES: MUSICAL RECITALS: EXCURSIONS

In addition to the regular classroom work there will be general public lectures on Monday evenings, and also lectures of general interest each week in connection with the work of various departments. They will be all announced in the Weekly Calendar.

Organ recitals will be given on Tuesday evenings in Sage Chapel and on Sunday evenings in Bailey Hall. A piano lecture-recital will be given each week.

Two concerts by distinguished artists will be given in the course of the session; see the Calendar on page 3. Students can buy tickets for these concerts at reduced rates.

Wednesday evenings are devoted to the departmental conferences, which are open to all interested persons. Notice of these conferences will be given from week to week.

Excursions, in connection with the work of certain departments, are made to many points of interest. Some of them are open to all members of the Summer Session. Especially noteworthy are the excursions to Watkins Glen and to Niagara Falls.

RAILROAD ROUTES TO ITHACA

Ithaca can be reached from New York City by either the Delaware, Lackawanna & Western or the Lehigh Valley Railroad. On both roads there are good trains, with Pullman cars, both night and day. Passengers from the west reach Ithaca by way of the Lehigh Valley Railroad from Buffalo. From stations on the Boston & Albany Railroad, the shortest route to Ithaca is by way of Syracuse and Auburn. From Philadelphia, and from Baltimore, Washington, and the south by way of the Baltimore & Ohio, the Philadelphia & Reading connects with the Lehigh Valley at Bethlehem. From stations on the Erie, connection with Ithaca can be made either by the Lackawanna at Owego or by the Lehigh Valley (Elmira and Cortland branch) at Elmira. Ithaca has connections with the New York Central at Geneva, Auburn, and Canastota.

COURSES OF INSTRUCTION

In this list the names of the departments of instruction are in alphabetical order. There is an index on page 69.

Most of the courses consist of five exercises a week, or one hour each week day except Saturday. The number of actual hours of class work in any course can be found by multiplying the number of weekly exercises by six.

Since instruction begins on Tuesday, all classes scheduled for five meetings a week will meet as usual on the first Saturday, July 11.

The word *hour* when used with reference to University credit means the equivalent of one class exercise a week for a half-year or one semester. One hundred and twenty such hours are required of candidates for the A.B. degree.

GS signifies *Goldwin Smith Hall*.

ASTRONOMY

S 1. General Astronomy. Credit two or three hours. Lectures and recitations, daily, 8. *Lincoln* 39. Laboratory, T or Th, 2 to 4, *Lincoln* 36, and observations at the *Observatory* at least one clear night each week from 7:30 till 9:30. Professor BOOTHROYD.

A general introductory course intended especially for teachers who may wish to prepare more thoroughly for teaching general science or geography. The lectures are illustrated by models and by lantern slides and the 12-inch equatorial and other instruments of the *Observatory* are used for observation and instruction. This is essentially the same as Course 182 in the College of Agriculture. Tancock's *Elements of Descriptive Astronomy* and Young's *Elements of Astronomy* are used for reference.

CHEMISTRY

The courses announced below correspond entirely or in part with courses given during the regular sessions of the University. For regular students the requirements for admission to the various courses will be the same as during the year.

Teachers may be admitted to any course for which their general training or experience may be considered to prepare them. Every effort will be made to meet the individual needs of teachers by arranging and modifying the work as far as possible so as to fulfill the particular requirements in each case.

All courses in Chemistry are given in the *Baker Laboratory of Chemistry*.

S 101. Introductory Inorganic Chemistry. Credit for a, b, and c, six hours.

(a) Lectures, daily except Sat., 12. *Main Lecture Room*. Professor BROWNE and Mr. HUGHES. The lectures deal with the fundamental theories and laws of chemistry, and with the more common elements and their compounds. They are profusely illustrated by experiments. The course is primarily designed to meet the needs of teachers in secondary schools, and to that end emphasis is laid upon methods of lecture presentation and experimental demonstration. Students other than teachers must, before registering, satisfy the department that they are properly prepared to carry on the work.

(b) Laboratory work, M W, 8-12, and T Th F, 9-12. *Room* 150. Dr. MCKINNEY and Mr. WILLISFORD. A series of experiments designed to illustrate the fundamental laws of chemistry and to acquaint the student with the properties of the principal elements and their compounds. For the benefit of teachers who may take the course special attention will be given to the methods of laboratory instruction, quantitative experiments, and the blowing of simple glass apparatus.

(c) Recitations. T Th F, 8. *Room* 22. Dr. MCKINNEY. The recitations deal with the subject matter of the lectures and with the experimental work in the laboratory and afford thorough drill in the solution of chemical problems.

S 205. Introductory Qualitative Analysis. Lectures, recitations, and laboratory practice. Credit six hours. Lectures and recitations, daily except S., 8, F, 11. *Room 107.* Dr. COREY. Laboratory, daily except S., 2-5, and M W, 9-12, *Room 50.* Dr. COREY and Mr. HUNTER.

The properties and reactions of the common elements, and of the common inorganic and organic acids; the qualitative analysis of a number of solutions and solid compounds.

S 210. Introductory Qualitative Analysis. Shorter course. Lectures and laboratory practice. Credit three hours. Lectures, M W, 11. *Room 107.* Dr. COREY. Laboratory, daily except S., 2-5. *Room 50.* Dr. COREY and Mr. HUNTER.

The properties and reactions of the common elements and acids, and their detection in various liquid and solid mixtures.

S 220. Introductory Quantitative Analysis. Lectures, recitations, and laboratory practice. Credit six hours. Lectures and recitations, daily except S., 8. *Room 207.* Assistant Professor NICHOLS. Laboratory, daily except S., 9-1. *Room 294.* Assistant Professor NICHOLS and Mr. TUCKER.

The preparation and standardization of various volumetric solutions, and their use in analyzing a variety of substances; gravimetric methods, stoichiometry.

S 225. Introductory Quantitative Analysis. Shorter course. Lectures and laboratory practice. Credit three hours. Lectures, T Th, 11. *Room 207.* Assistant Professor NICHOLS. Laboratory, daily except S., 8-11. *Room 294.* Assistant Professor NICHOLS and Mr. TUCKER.

The preparation and use of volumetric solutions and work in elementary gravimetric analysis.

S 230. Advanced Quantitative Analysis. Recitations and laboratory practice. Credit two to four hours. Laboratory, daily except S., 8-1. *Room 294.* Assistant Professor NICHOLS and Mr. TUCKER.

Gravimetric, volumetric, and electrolytic methods of analysis, and methods of combustion analysis; the calibration of weights and volumetric apparatus, analysis of iron and steel, alloys, silicates, etc.

S 305. Introductory Organic Chemistry.

A. Aliphatic Compounds. Credit three hours. Lectures and written reviews. Daily, 9. *Room 207.* Dr. CORNWELL and Mr. JOHNSON.

B. Aromatic Compounds. Credit three hours. Lectures and written reviews. Daily, 8. *Room 202.* Open to those who have had or who are taking S 305 A. Mr. LACEY and Mr. JOHNSON.

The lectures discuss systematically the more important compounds of carbon, their occurrence, methods of preparation, reactions, relations, and uses.

S 310. Introductory Organic Chemistry.

A. Aliphatic Compounds. Credit one to three hours. Laboratory practice and oral reviews. Open to those who have had or are taking S 305 A. Hours to be arranged. Mr. LACEY and Mr. JOHNSON.

B. Aromatic Compounds. Credit one to three hours. Laboratory practice and oral reviews. Open to those who have had or are taking S 305 B and S 310 A. Hours to be arranged. Mr. LACEY and Mr. JOHNSON.

The student prepares a large number of typical compounds of carbon, and familiarizes himself with their properties, reactions, and relations. It is recommended that S 305 A and S 310 A be taken in one summer, and that S 305 B and S 310 B be taken in the following summer. In exceptional cases S 305 A and S 310 A, and S 305 B but not 310 B may be taken together by special permission.

S 320. Advanced Organic Chemistry. Credit two or more hours. Laboratory practice at hours to be arranged. Dr. CORNWELL and Mr. LACEY.

The course in the preparation of organic compounds is here continued, the preparations, however, being more difficult, and requiring more skill and experience on the part of the student.

S 330. The Coal Tar Dyestuffs. Credit two to four hours. Laboratory practice. Hours to be arranged. Dr. CORNWELL and Mr. LACEY.

Various intermediate products used in the preparation of dyes are made and from these, representatives of the different groups of dyestuffs are prepared and studied.

S 340. Methods of Organic Analysis. Credit two or more hours. Laboratory practice. Hours to be arranged. This course presupposes courses in introductory organic chemistry and introductory quantitative analysis. Dr. CORNWELL and Mr. LACEY.

This course comprises the qualitative and quantitative analysis of pure organic compounds, and of such commercial products as alcohols, ethers, organic acids, glycerol, formalin, acetates, soaps, turpentine, rosin, oils, etc.

S 375. Introductory Organic Chemistry. SHORTER COURSE. Aliphatic compounds. Lectures and recitations. Daily, 9. Room 207. Dr. CORNWELL and Mr. JOHNSON. Aromatic compounds. Lectures and recitations. Daily, 10. Room 202, during the latter half of the session only. Mr. LACEY and Mr. JOHNSON.

Required of students in the Department of Home Economics. Credit four hours for lectures and recitations.

Laboratory practice at hours to be arranged. Credit one or two hours. Mr. LACEY and Mr. JOHNSON.

This course is primarily designed for students preparing for the study of medicine, who are required to take the whole six hours.

S 405. Introductory Physical Chemistry.

A. Credit three hours. Lectures, daily except Sat., 8, and two other lectures at hours to be arranged. Room 7. Assistant Professor BRIGGS and Mr. KELLER. A systematic presentation of modern chemical theory. The subject matter includes: atomic and molecular theory; gases, liquids, and solids; the theory of solution; colloid chemistry and adsorption; reaction velocity, catalysis, and equilibrium in homogeneous systems.

B. Credit three hours. Lectures, daily except Sat., 9, and two other lectures at hours to be arranged. Room 7. Assistant Professor BRIGGS and Mr. KELLER. A continuation of Part A. The subject matter includes the phase rule and its applications; thermochemistry; electrochemistry; photochemistry; application of the principles of physical chemistry to actual practice.

S 410. Physical Chemistry Laboratory. A. Credit three hours. Laboratory practice, daily except Sat., 8-1. Room 1. Assistant Professor BRIGGS and Mr. KELLER. Open only to those who have taken or are taking Course S 405 A or its equivalent. With the data obtained in the laboratory as a basis, detailed reports are written covering each of the following topics: molecular weight determination by vapor density, boiling point and freezing point methods; vapor pressure; viscosity; distillation of liquid mixtures.

B. Credit three hours. Laboratory practice, daily except Sat., 8-1. Room 1. Assistant Professor BRIGGS and Mr. KELLER. Open to those only who have taken or are taking Course S 405 B or its equivalent. The course is a continuation of Part A. The following topics are considered: dissociation; solubility; reactions; reaction velocity and catalysis; indicators; thermochemistry; diffusion; colloids and adsorption; photochemical reactions; phase rule studies of inversion points; solid-liquid, liquid-liquid, compounds.

S 465. Laboratory Practice in Physical Chemistry. Credit one to three hours. Laboratory periods to be arranged. Assistant Professor BRIGGS and Mr. KELLER.

This course is designed to afford opportunity for special laboratory practice in physical chemistry, colloid chemistry, or electrochemistry.

S 195, S 295, S 395, S 495, S 595. Research. Credit one to six hours. Senior chemists, and others by special permission, may elect research in the fields of Inorganic, Analytical, Organic, or Physical Chemistry, or Chemical Microscopy, under the direction of some member of the staff of instruction.

S 180. Teachers' Course in Chemistry. Daily except Sat., 10. Room 22. Credit two hours. Dr. McKINNEY. Lectures, discussions, and conferences concerning the teaching of chemistry in the secondary schools.

S 530. Introductory Chemical Microscopy. Lectures and laboratory practice. Credit three hours. Three lectures and five 2½ hour laboratory periods a week. Hours to be arranged. *Room 378. Dr. MASON.*

The use of the microscope and its accessories; microscopic methods as applied to chemical investigations; micrometry; the examination of crystalline compounds; recognition of textile and paper fibers, etc. The application of microscopic methods to quantitative analysis.

S 535. Advanced Chemical Microscopy. Laboratory practice. Credit three hours. Prerequisite course S 530. Laboratory periods and conference hours to be arranged. *Room 378. Dr. MASON.*

Practice in the examination and analysis of inorganic substances containing the more common elements, with special reference to rapid qualitative methods and to the analysis of minute amounts of material.

Students not desiring University credit, who wish to secure a working knowledge of Chemical Microscopy in the shortest possible time, may arrange with the instructor to cover the parts of both of the above courses which best meet their needs.

DRAWING AND PAINTING

S 1. Color From Still Life. Daily except Sat., 8-10. *Franklin.* Assistant Professor STONE, Professor ADAMS, and Assistant Professor GARRETT.

Instruction will be given in one or more of the following media: oil, water color, pastel.

S 2. Outdoor Sketching. Daily except Sat., 2-4. *Franklin.* Assistant Professor STONE and Assistant Professor GARRETT.

Sketching from nature in oil or in watercolor. Only those who submit original work in one of these media will be admitted to this class.

S 3. Drawing From Antique. Daily except Sat., 2-4. *Franklin.* Professor ADAMS.

Instruction will be given in charcoal drawing from casts.

S 4. Drawing From Life. Daily except Sat., 10-12. *Franklin.* Assistant Professor STONE.

Instruction will be given in charcoal drawing from the human figure. A fee of ten dollars will be charged for this course.

ECONOMICS

The following courses are designed to meet the needs of three classes of students in the Summer Session: (1) those desiring regular college credit for general economics; (2) students with special interests in economic subjects; (3) students seeking broad preparation for the teaching of economics in secondary schools. For the first group, Course S 1 covers the subject-matter usually included under elementary economics. For Cornell students Course S 1 satisfies the economics requirement in the College of Engineering and will also serve in lieu of Course 51 as a prerequisite for admission to various advanced courses in Economics. Graduate students wishing to pursue special investigations will be afforded assistance by members of the Summer Session staff of instruction and by other members of the Department of Economics of the University who may be in residence in Ithaca during the summer.

S 1. Principles of Economics. Credit four hours. Twice daily except Sat., 11 and 12. *GS 142.* Assistant Professor KENDRICK, Mr. HUDGINS, and Mr. CLARK.

A general introduction to economics, covering the fundamental principles of value and the distribution of wealth, together with the elements of money and banking.

S 4. Introduction to the Study of Society. Credit two hours. Daily except Sat., 10. *GS 124.* Professor BARNES.

A survey of the geographic, biological, psychological, economic, and historical factors in social development.

S 5. The Historical Background of Modern Social Progress. Credit two hours. Daily except Sat., 11. *GS 124.* Professor BARNES.

An historical explanation of the various types of bias, prejudice, and obscurantism which obstruct social science; the beginnings of a scientific point of view in the rise of the modern order; the growth of the critical and rationalistic philosophy; the rise and triumph of the evolutionary doctrine; and the trend toward the humanizing of knowledge.

S 6. Corporation and Investment Finance. Credit two hours. Daily except Sat., 10. *GS 264.* Professor REED.

A study of the financial problems of the business corporation from the points of view both of the management and of the interested investor.

S 8. Commercial Banking. Credit two hours. Daily except Sat., 9. *GS 264.* Professor REED.

Emphasis will be placed upon the institutional development of commercial banking rather than upon the internal problems of bank management. Particular attention will be devoted to the Federal Reserve system.

S 10. Accounting. Credit three hours. Daily except Sat., 8, and practice at hours to be arranged. *GS 242.* Professor ENGLISH.

An introductory course dealing with the theory of debit and credit; the journal and ledger; the development of books of original entry; analysis of balance sheets and income statements.

S 11. Financial Analysis. Credit one hour. M W F, 11. Prerequisite a knowledge of elementary accounting. *GS 190.* Professor ENGLISH.

A study of the regulations of the Interstate Commerce Commission and their bearing on the problem of determining security values.

EDUCATION

Courses S 1, S 2, S 3, and S 4, will be found especially helpful to college graduates who are preparing for examinations in professional subjects as outlined in the New York State Syllabus and Course of Study for the renewal of the College Graduate Certificate Limited. The State Department of Education will hold an official examination for such candidates at Ithaca on August 20 and 21.

Under certain conditions teachers may waive the state examination by completing an approved course of study in the Summer Session. Information regarding details of such a course may be had by consulting Professor R. H. JORDAN, Goldwin Smith Hall 121, either in person or by letter.

S 1. Educational Psychology. Credit two hours. Daily except Sat., 12. *GS 256.* Professor OGDEN.

A study of the learning process and its application to educational theory and practice; the original nature of man, reflex action and instinct; the acquisition of habits; attention, memory, association, and thinking; fatigue, individual differences, and social co-operation.

S 2. Principles of Education. Credit two hours. Daily except Sat., 9. *GS 256.* Professor JOHNSON.

A study of education from the sociological point of view, the biological and psychological bases; the problem of aim; formal discipline; social and personal objectives; the studies and their functions; the administrative curriculum; especial reference is made throughout to secondary education.

S 3. History of Education. Credit two hours. Lectures, recitations, and prescribed readings. Daily except Sat., 11. *GS 256.* Assistant Professor WAKEMAN.

The purpose of this course is to give an understanding of present educational values and practices through an historical consideration of their origin and development.

The topics treated are to a great extent those emphasized in the syllabus for the New York State Teachers' Certificate; education in primitive and barbaric societies; the rise of the school as an institution; Greek and Roman education;

scholasticism, humanism, and realism; the 'psychological' movement; the origin and nature of specifically modern tendencies in education.

S 4. Secondary School Methods. Credit two hours. Daily except Sat., 10. GS 256. Professor JOHNSON.

A study of the principles underlying teaching in the secondary school; methods of class instruction; interest and effort; questioning; lesson assignment; lesson plans; class and school management; supervised study; socialized instruction; the project. The course is planned to meet the New York State Certificate requirement in general method, and is adapted especially to the needs of younger and relatively less experienced teachers.

S 5. High School Administration. Credit two hours. Daily except Sat., 8. GS 120. Professor JORDAN.

A study of the principles basic to administration of the senior and junior high school; the course of study; principles of election; classification of pupils; use of intelligence and achievement tests; the principal as supervisor; building problems; selection and rating of teachers; schedule-making; problems growing out of the experience of the class. Cubberley's *The Principal and His School* will be used as a basis for discussion.

S 6. Classroom Tests and Measurements. Credit two hours. Daily except Sat., 10. GS 160. Mr. GILBERT.

Use of educational measurements and standard scales in the solution of typical educational problems; class and individual diagnosis in the light of achievement tests; remedial measures following such diagnosis.

Textbook: Monroe, *Measuring the Results of Teaching*.

S 7. Mental Measurements. Credit three hours. Lectures, prescribed readings, and laboratory. Daily except Sat., 9. GS 242. Laboratory, T Th, 2-4:30. GS 248. Assistant Professor WAKEMAN.

The first half of this course furnishes a general introduction to the psychology and practice of mental tests. The lectures deal with the historical development of tests; the principles underlying their formation and application; the single tests and the test systems; a detailed study of the principles and use of the Stanford Revision of the Binet-Simon Scale; a brief consideration of the measures of central tendency, variability, and correlation; the bearing of tests upon the problems of psychological theory (nature and distribution of intelligence, the correlation of abilities, etc.). The laboratory work is intended to give practice in administering tests, both to individuals and to groups.

The second half of the course will consider the use of the tests in schools for the diagnosis of defective and exceptional abilities; the causes, frequency, and consequences of mental deficiency; the social and educational treatment of defective, delinquent, retarded, superior, and psychopathic children.

Textbooks: Terman, *The Measurement of Intelligence*. Woodrow, *Brightness and Dullness in Children*.

S 8. Foundations of Method. Credit two hours. Daily except Sat., 12. GS 242. Professor MOORE.

This course is designed primarily for experienced elementary and high school teachers and supervisors. It will include a critical examination of current and proposed educational methods in the light of accepted principles of educational psychology. Special attention will be given to the theories involved in project-teaching. The course will include such topics as the laws of learning, interest and effort, the thinking process, the organization of experience, the relationship between subject matter and the educative process, discipline and moral training.

S 9. Advanced Work in Education. Hours and credits to be arranged. GS 248. Professor OGDEN and the other members of the staff.

As a prerequisite for this course one of the courses S 2, S 3, or S 7, or an equivalent, is necessary. The work may consist either of essays and reports upon some special topic, or of laboratory practice of an advanced grade. A seminary will be held if application is made by a sufficient number of advanced students.

S 10. Problems in School Administration. Credit two hours. M W, 2-4:30. *GS 236.* Professor JORDAN.

A study of administration of school systems, and of problems of the secondary school in particular; evaluation and improvement of teaching and of curricular offerings; extra-curricular activities; the administrator and the community.

Open to graduate students and to teachers of experience who have had previous courses in education. Papers and reports required.

S 11. Visual Instruction. Credit two hours. Daily except Sat., 11. *GS 134.* Mr. ABRAMS.

Picture expression and language expression compared; the psychological basis for the use of visual aids in instruction; the relation of pictures to the imagination, to interest, and to effort; the place and limits of each; definition and essentials of the visual method; relation to particular studies; the equipment needed and how to use it; the extent to which the method may be used with profit; types of visual aids and the special value of each; standards for selection of pictures; how to read pictures. Demonstration lessons, conferences, criticisms of particular pictures, exhibits.

See also Geography and Geology, Course S 12a.

S 12. Seminary in Visual Instruction. Credit two hours. M W F, 9. *GS 134.* Mr. ABRAMS.

This course is intended for those interested in the selection, organization, and distribution of visual aids to instruction and in the supervision and direction of their use, including producers, members of bureau staffs, principals of schools, supervisors, and librarians. Topics: educational and pictorial standards for selection (more technical than in course 11); accessioning, classifying, labeling, and filing; work of special bureaus of visual instruction, school systems, and libraries; practical schemes of distribution; aims and methods in supervision; discussion of truthfulness, authenticity, quality, expressiveness, and attractiveness as applied to pictures; criticisms of book illustrations; equipment needed.

This course will be adapted to the special needs of the persons taking it.

S 13. History of American Education. Credit two hours. Daily except Sat., 10. *Caldwell 143.* Professor MOORE.

The origin and development of American educational movements and institutions. Brief consideration of European educational background in relation to early American education. Special emphasis on development of public education as shown in various state systems of public instruction and the social, religious, economic, and political factors influencing its organization, administration, and function.

S 17. Mental Development. Credit two hours. Prerequisite course S 1 or its equivalent. T Th, 2-4:30. *GS 236.* Professor OGDEN.

A course in child psychology, dealing with the facts of mental growth and their interpretation.

S 32. Psychology of Reading. Credit two hours. Daily except Sat., 11. *Caldwell 100.* Professor GRAY.

This course deals with different phases of the reading process as developed by experiment; perception as it relates to reading; motor phases; higher mental activities involved. Diagnosis and remedial work will be considered. Intended for teachers, principals, supervisors, and superintendents.

TEACHERS' COURSES IN HIGH SCHOOL SUBJECTS

The following courses are offered for teachers desiring to study problems of instruction in different high school subjects. The courses are planned also to meet the requirements of the New York State Department of Education in the issuance of the College Graduate Life Certificate.

TEACHERS' COURSE IN CHEMISTRY. See Chemistry S 180.

TEACHERS' COURSE IN ENGLISH. See English S 5.

TEACHERS' COURSE IN HISTORY. See History S 17.

TEACHERS' COURSE IN LATIN. See Latin S 1.

TEACHERS' COURSE IN MATHEMATICS. See Mathematics S 20.

TEACHERS' COURSE IN MUSIC. See Music S 20, S 21.

TEACHERS' COURSE IN PHYSICS. See Physics S 90.

TEACHERS' COURSE IN PUBLIC SPEAKING. See Public Speaking S 3, S 9.

TEACHERS' COURSE IN ROMANCE LANGUAGES. See French S 30, and Spanish S 30.

RURAL EDUCATION

The attention of teachers is called to the courses in Rural Education under the head of Summer School of Agriculture.

TRAINING COURSE FOR PSYCHOLOGICAL EXAMINERS

By recent legislative enactment of the State of New York, special classes for defective children must be formed whenever ten or more such cases are found in any school district. A similar law is operative in New Jersey, and like requirements are being made in other states. Not only is there a considerable consequent demand for teachers trained in the examination and instruction of defectives, but with the increasing recognition of the extent and importance of individual differences in endowment, there is increasing recognition of the usefulness of familiarity with the methods and interpretation of psychological examinations, not only for the mentally backward and subnormal, but also for the normal and supernormal, and in other fields than that of education.

To assist in meeting these various needs, the departments of Education and Psychology call special attention to courses in Introductory, Experimental, and Educational Psychology, and to the course in Mental Measurements. The latter has been expanded to give a thorough training in administration of tests, and in the evaluation and application of results. Students who wish to enter this course with a view to educational and field service, are advised to register for such additional courses in psychology as may be helpful in providing an adequate understanding of psychological principles and methods of investigation. Advice in the selection of courses with regard to the individual needs of the student may be had by consulting Professor R. M. OGDEN, Goldwin Smith Hall 246, either in person or by letter.

ENGINEERING

The courses in engineering described below are equal in character to corresponding courses given in the College of Engineering during the regular session. They will be accepted for credit towards graduation by the several schools of the college so far as they apply to the prescribed work of the school concerned. Students in the College of Engineering who may desire to offer work done in the Summer Session toward graduation should consult the Director of the School in which they are regularly registered before registering in the Summer Session. Others may obtain full information concerning these courses by applying to the Secretary of the College of Engineering.

DRAWING

S 3. Elementary Engineering Drawing for Secondary Schools. M T W Th F, 8-11, 9-12, and M T Th F, 2-5. *East Sibley* 206. Professor TOWNSEND.

This course is designed for those who wish to teach mechanical drawing in secondary schools and for those who feel the need of a more complete knowledge of this subject to assist them in teaching shop work. Some of the topics covered are use of instruments, lettering, orthographic and isometric projection, inking, tracing, conventions, and working drawings. Students familiar with these topics may elect a more advanced course.

Students must be provided with a set of drawing instruments, an architect's scale, a 30°, 60°, and a 45° triangle.

S 123. Engineering Drawing. M T W Th F, 8-11, 9-12, and M T Th F, 2-5. *East Sibley* 206. Professor TOWNSEND.

A course in drawing for beginners, covering use of instruments, orthographic and isometric projection, inking, tracing, convention, working drawings.

DESCRIPTIVE GEOMETRY

S 10. Descriptive Geometry. Lectures, daily except Sat., 9. Recitations and drawing, daily except Sat., 10-12, and 2-5. *Lincoln.* Assistant Professor POND.

A study of the representation of lines, planes, surfaces, and solids, and their interrelations. Warped surfaces, tangencies, intersections, and perspective. The work is the same as that given in the regular C.E. courses 201 and 202; and the student will receive four hours of credit if he takes the whole course. A three-hour course that does not include perspective, and fulfills the requirements of course 124 of the Sibley School of Mechanical Engineering and the School of Electrical Engineering will also be given from 2-5 P. M. The morning and afternoon sessions make it possible to readjust the schedule so as to accommodate nearly all who may wish to take either course. Those who take course 124 may do their work in the 9-12 period.

KINEMATICS

S 313. Kinematics. Credit three hours. Must be taken with course S 314 and is the equivalent of course 313. Prerequisite courses, Physics 6, 330, 311, and 124. Eight recitations a week on the theory of mechanisms, instant centers, cams, gears, linkages, velocity and acceleration diagrams. Daily except Sat., 9, and M W F, 12. Professor ROGERS.

S 314. Kinematics Drawing. Credit two hours. Must be taken with course S 313 and is the equivalent of course 314. Prerequisite courses Physics 6, 330, 311, and 124. Five three-hour drawing periods a week: drawing board application of the theory and principles of course S 6 in the construction of cams and gears, the solution of linkage and instant center problems, and the determination of velocity and acceleration diagrams, etc. T Th, 10-1, M T W Th F, 2-5. Professor ROGERS.

MECHANICS OF ENGINEERING

The following courses in Mechanics of Engineering are open to students from other universities, subject to the same requirements for admission as are made for Cornell students. See the Announcement of the College of Engineering for more detailed description of Courses 220, 221, 223, 334 and 336. Professors GEORGE and GARRETT, Assistant Professor CORNELL, and Mr. HOWELL. Office, Room 22a, Lincoln Hall.

S 20. Mechanics. Credit five hours. Equivalent to C.E. 220. Recitations, daily, 8 and 11; and two computing periods a week.

S 21. Mechanics. Work and Energy and Mechanics of Materials. One section. Credit five hours. Equivalent to C.E. 221. Prerequisite course 220 or the equivalent. Recitations, daily, 9 and 12; and two computing periods a week. See S 21A.

S 21 A. Mechanics Laboratory. Equivalent to C.E. 221 A. Must be taken with S 21. Hours to be arranged.

S 23. Engineering Problems. Credit two hours. Equivalent to C.E. 223. Five computing periods a week. Will be given only if enough students register for the course.

S 34. Mechanics. Credit six hours. One section. Twelve recitations a week and three computing periods. Equivalent to Sibley 334. Recitations, daily, 8 and 11. Computing periods to be arranged.

S 36. Mechanics of Materials. Credit five hours. Two sections. Eleven recitations and two computing periods a week. Equivalent to Sibley 336. Prerequisite course 220 or 334, or the equivalent. Recitations: Section A, daily, 8 and 10. Section B, daily, 9 and 12. Computations to be arranged.

HYDRAULICS

240. Hydraulics. Credit four hours. Prerequisite courses 220, 221, or 334, 336. Five recitations and three computing periods a week. Ten demonstration lectures are given in periods to be arranged. Daily except Sat., 10; M W F, 2-4:30. The Schools of Mechanical and Electrical Engineering will accept this course for 335. Professor SCHODER.

Hydrostatics, including stability of gravity dams, immersion and flotation, gas volumes and pressures; flow of liquids through orifices, nozzles, Venturi meters, pipes, and over weirs; time required to fill and empty tanks and canal locks; simple, compound, branching, and looping pipes; elementary power calculations in common pumping and fire protection problems. Flow of water in open channels. Elementary consideration of modern water wheels.

STRUCTURAL ENGINEERING

C. E. 270. Structural Design and Bridge Stresses. Credit four hours. Lectures, recitations, computations, and drawings at hours to be assigned. *Lincoln 14 and 29.* Prerequisite C.E. 220, 221. Assistant Professor BURROWS.

One-fourth of the course includes structural details, i.e., the design of a wooden roof truss and other timber joints. The remainder of the course includes dead load, live load, and impact stresses in simple bridge trusses due to uniform live panel loads, locomotive axle loads, and highway loads.

C. E. 271. Structural Design. Credit three hours. Lectures, computations, and drawing. Daily, at hours to be assigned. *Lincoln 14.* Prerequisite C. E. 270. Assistant Professor BURROWS.

An elementary course in steel design. Complete design, detail drawing, bill of material, and estimate of weight of a steel roof truss, a through and a deck-plate girder bridge.

C. E. 274. Bridge Design. Credit three hours. Computation and drawing, daily, at hours to be arranged. Prerequisite C. E. 271. Assistant Professor BURROWS.

Computations and drawing for the complete design of a riveted railroad bridge of six or seven panels, the stresses for which were computed in connection with the previous study of bridge stresses. The computations to determine the sections of all members and of pins, pin plates, splices, and other details as well as of connecting rivets are to be written up in systematically arranged reports. The drawing consists of general plans showing the location of all rivets as well as the composition and relation of all members and connections. The final reports are to give a full list of shapes and plates, and a classified analysis of weight for the span.

C. E. 280. Concrete Construction. Credit three hours. Daily, at hours to be arranged. Prerequisite courses C. E. 220, 221, 225, and 226. Assistant Professor URQUHART.

Concrete materials, properties of plain concrete, its making and deposition; elementary theory of reinforced concrete as applied to columns, rectangular beams, and slabs; T-beams reinforced for compression; direct stress combined with flexure.

C. E. 281. Masonry and Foundations. Credit three hours. Daily except Sat., 8. Prerequisite courses 220 and 221. Piles and pile driving, including timber, concrete, tubular, and sheet piles; cofferdams; box and open caissons; pneumatic caissons for bridges and buildings, caisson sinking, and physiological effects of compressed air; pier foundations in open wells; freezing process; hydraulic caissons; ordinary bridge piers; cylinders and pivot piers; bridge abutments; spread footings for building foundations; underpinning buildings; subterranean explorations; unit loads. Textbook: Jacoby and Davis's *Foundations of Bridges and Buildings*. Recitations, collateral reading in engineering periodicals, and illustrated reports. Assistant Professor URQUHART.

C. E. 282. Reinforced Concrete Building Design. Credit three hours. Daily, at hours to be arranged. Prerequisite course C. E. 280. Assistant Professor URQUHART.

Design of a reinforced concrete flat-slab building and an investigation of various other types of floor systems for commercial buildings. Complete detail design for one building, including stairways, elevator shafts, penthouses, etc. Working drawings and steel schedules.

ENGLISH

Courses S 1 and S 2 taken together will be considered the equivalent of the first term of Course 1 in the regular University session.

Courses in brackets are not given in the summer of 1925, but may be expected in the summer of 1926.

S 1. Composition. Credit two hours. Daily except Sat., 8. GS 177. Mr. GREENE.

A practical drill intended for those who lack proficiency in writing; discussions of the elements and forms of discourse; frequent exercises, mainly expository; personal conferences at hours to be appointed.

S 2. Introductory Course in Literature. Credit two hours. Daily except Sat., 9. GS 164. Mr. GREENE.

An introduction to the study of literature, dealing chiefly with the shorter poems of Tennyson and of Browning.

S 4. Advanced Composition. Credit two hours. Daily except Sat., 11. GS 164. Professor STRUNK.

The planning, writing, and criticism of essays and of other exercises in composition, accompanied by a study of general principles of writing and of questions of English usage. Open only to teachers and to students who have had one year of college English.

S 5. Teachers' Course. Credit two hours. Daily except Sat., 10. GS 156. Professor NORTHUP.

Lectures, readings, reports, and discussions. Designed for those who are teaching or who expect to teach English in schools. The organization of the high school course in English; methods of treating the works named by the Conference on Uniform Entrance Requirements in English; the teaching of literature in general; supplementary reading for pupils and teacher; the use of the school library and the public library; stage productions; the place of language and grammar in the high school; problems of oral and written composition; the relation of composition to literature and to other subjects in the curriculum.

S 6. Nineteenth Century Poetry. Credit two hours. Daily except Sat., 11. GS 156. Professor HARPER.

A study of the poetry of Wordsworth and Coleridge, and of their relation to the revolutionary movement and to the new birth of English poetry. Texts: *The Poems of Wordsworth* in the Modern Student's Library; *The Poetical Works of Coleridge*, Oxford edition.

S 7. Nineteenth Century Poetry. Credit two hours. Daily except Sat., 10. GS 164. Assistant Professor HEBEL.

A study and discussion of the most important poems of Byron, Shelley, and Keats.

S 8. Modern Prose. Credit two hours. Daily except Sat., 10. GS 162. Assistant Professor FISKE.

A study of a few representative nineteenth century essays on the theory of prose style; illustrative readings in Newman, Ruskin, Pater, and Stevenson.

S 9. Milton. Credit two hours. Daily except Sat., 12. GS 156. Professor HARPER.

Milton's poetry, life, learning, religious and political opinions. The poems will be considered chronologically, as witnesses to the changing times. Reading of Milton's English poems in full, and of the *Areopagitica*. Texts: Poems in the Students' Cambridge edition; essays in Riverside edition.

S 10. Shakespeare. Credit two hours. Daily except Sat., 9. GS 156. Professor STRUNK.

A study of Hamlet, Othello, Lear, and Macbeth, with stress upon the art of Shakespeare as a playwright.

S 11. American Literature. Credit two hours. Daily except Sat., 12. GS 164. Assistant Professor HEBEL.

A study of the American poets of the nineteenth century with particular attention to Bryant, Poe, Whittier, Longfellow, Lowell, Holmes, Emerson, and Whitman. Text: Page, *Chief American Poets*.

S 12. Victorian Literature. Credit two hours. Daily except Sat., 8. *GS 164.* Assistant Professor FISKE.

A study of some typical Victorian prose and poetry, including essays of Carlyle and Arnold, and poems of Clough, Swinburne, Morris, Rossetti, Arnold, Tennyson, and Browning.

This course does not cover the ground of course S 2.

[S 13. The English Novel. Credit two hours. Daily except Sat., 11. *GS 164.*

A brief historical survey of the novel in English is followed by detailed study and discussion of the novelists of the nineteenth century. This course may serviceably supplement course S 12.]

S 16. The English Language. Credit two hours. Daily except Sat., 9. *GS 162.* Assistant Professor MONROE.

A study of essential features in the growth and development of the mother-tongue. Among the topics considered are: language and grammar in general; some misconceptions about the life of language; the relationships of English; phonetics, with practical exercises; the English vocabulary; inflections; native resources and foreign influences; modern English grammar; syntax; disputed usages; the bearing of historical grammar on present forms and usages, spoken and written.

Recitations, lectures, collateral reading. The course does not require previous knowledge of Old or Middle English.

S 18. Old English. Credit two hours. Daily except Sat., 12, *GS 162.* Assistant Professor MONROE.

This course is intended for students who, lacking the opportunity hitherto, now wish by earnest effort to acquire some knowledge of English in its early form. Lessons in grammar are followed as soon as possible by the reading of easy prose of the time of Alfred the Great.

The course may be taken by undergraduates; and, with additional reading, by graduates as a part of their work for the master's degree. The time of meeting may be changed to suit the convenience of the class.

SEMINARY

S 25. Seminary in English Literature. For graduates only. Hours and room to be arranged. First meeting Wednesday, July 8, 3 P. M. *Goldwin Smith 164.* Professor NORTHUP.

Designed especially as an introduction to the graduate study of literature but open also to students who have already done some graduate work. The special topic for the present session is the History of the Romantic Movement.

GEOGRAPHY AND GEOLOGY

The lecture rooms and laboratories are in *McGraw Hall*. It is the purpose of this department to meet, primarily, the needs of teachers in grammar schools, high schools, normal schools, and colleges. A second aim is to provide courses of practical and cultural value to college students. The work embraces lectures, laboratory, and field instruction in physical, commercial, and regional geography, and in the elements of geology; also educational methods in geography. The environs of Cornell University are rich in phenomena of geographic and geologic interest. Field excursions, consequently, are made an especially important part of the work of this department in the Summer Session. The laboratories are well equipped with apparatus and illustrative material for instruction. The material includes teaching and reference collections of minerals, rocks, fossils, maps, photographs, models, and more than five thousand lantern slides.

Students planning to take work in the department should, if possible, consult the instructor and register for courses on Monday, July 6, at rooms indicated.

The attention of prospective students in the Summer Session who are especially interested in geographic and geologic studies is invited to courses given in other

departments, courses which afford opportunities for additional instruction in these studies. Such courses are described in other pages of this pamphlet under the heads of METEOROLOGY AND CLIMATOLOGY, offered in the Summer School of Agriculture; ASTRONOMY; and VISUAL INSTRUCTION. The courses in Visual Instruction are Education S 11 and S 12, and Geography and Geology S 12a; since they deal with the sources, selection, and organization of visual aids to instruction in geography and geology, they will be valuable to persons who teach or are planning to teach either of these subjects.

LECTURE COURSES IN GEOGRAPHY AND GEOLOGY

S 1. Physical Geography. Credit two hours. Daily except Sat., 9. *Geological Lecture Room, McGraw Hall* (first floor, south end). Professor VON ENGELN.

An introductory course in physical geography, including discussion of the origin and form of the continents; the uplift and denudation of the land; the physiographic functions of the atmosphere, ground water, streams, winds, and glaciers; the glaciation of North America; the elements of oceanography.

The lectures in physical geography are fully illustrated by lantern slides and by wall and globe maps. Students registering in this course are advised to take also the related courses S 8 and S 10.

Entrance Credit for Physical Geography to Cornell University. To secure entrance credit ($\frac{1}{2}$ unit) in Physical Geography it is required that the student attend, complete all required work, and pass the examinations in courses S 1, S 8, and S 10.

S 2. Commercial Geography. Credit two hours. Daily except Sat., 11. *Geological Lecture Room.* Professor VON ENGELN.

Consideration of the nature, variety, and importance of geographical environment and of natural resources as referred to national coherence and organization, the development of commerce, and the distribution of industries. Lectures and study of texts. The student should gain through this course a broad understanding of the geographic factors that are fundamental to such national problems as conservation, prosperity of different communities, domestic and foreign trade, location and growth of cities.

S 3. Regional Geography. Credit two hours. Daily except Sat., 8. *Geological Lecture Room.* Professor BROWN.

Based on a study of European and American regions. The major and the minor regions; the basis of the divisions and sub-divisions; the use of each. The physiographic, geographic, and political regions: their distinction and varying controls.

An inductive study of a few selected localities in Europe and in the United States in order to gain principles; and a deductive study of others to test the principles in specific territories.

S 4. Principles of Political Geography. Credit two hours. Daily except Sat., 10. *Physical Geography Laboratory.* Professor BROWN.

The study of groups and of nationalities: a. their boundaries; reasons for and limits of expansion; sustenance controls; migrations; b. the group itself; uniting forces and ideals as they are based on environment; limits of independence, and relationships with other groups; c. peoples; schemes of classification; the geographic division of peoples; tendencies and aims; reasons for differences.

S 5. Geology. Credit two hours. Daily except Sat., 10. *Geological Lecture Room.* Associate Professor DECKER.

An introductory course in geology, consisting of lectures and assigned readings upon the following topics: origin of the earth; geologic history of the earth; materials of the earth's crust and their arrangement, as well as the forces modifying them; vulcanism, earthquakes, and similar phenomena; development of life on the earth.

The lectures will be illustrated with lantern slides, models, maps, and specimens. Students registering for this course are urged to take the laboratory Course S 9 and, if possible, Course S 10. Credit for Geology course 1, regular session, will be allowed only for successful completion of all three courses S 5, S 9, S 10.

S 6. Mineral Resources. Credit two hours. Daily except Sat., 8. *General Geological Laboratory.* Associate Professor DECKER.

A course in which the principal mineral resources both metallic and non-metallic of the United States will be discussed with reference to the following points: distribution, mode of occurrence, uses, relative importance, rank of the United States among nations of the world in production, and the influence of the various deposits upon the development of the regions in which they occur.

An exceptionally complete collection of specimens is available as illustrative material for this course.

LABORATORY AND EXCURSION COURSES IN BOTH GEOGRAPHY AND GEOLOGY

S 8. Physical Geography, Laboratory Course. Credit one hour. T Th, 2-4. *Physical Geography Laboratory.* Professor LEIGHTON, Miss BROTHERHOOD, and Miss VAN ORDER.

The members of this class will make a systematic study of the physiographic regions of the United States, using contour maps, models, and the experimental laboratory of the department in a laboratory study of the subject. By such study of the topographic, regional, and life relationships (human, animal, and plant) the geography of the United States will be correlated and presented as an orderly whole. The course will prove of worth to grade teachers of geography who wish to obtain a broader basis for their work in the subject as well as for those who expect to teach geography in the high schools.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

S 9. Geology, Laboratory Course. Credit one hour. W F, 2-4. *General Geology Laboratory.* Professor LEIGHTON, Miss BROTHERHOOD, and Miss VAN ORDER.

This course is designed to supplement course S 5. A study will be made of the more common structural phenomena; of the interpretation and uses of geological maps; of characteristic life forms developed in different geologic periods; and of the more common rocks and minerals. Short field excursions will be made to collect both rock specimens and fossils.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

S 10. Geography and Geology, Field Course. This course should be elected by all those registering in Course S 1 or S 5 and is required of all those who desire entrance credit in physical geography. With courses S 1 and S 8 it affords a comprehensive course in physical geography; with courses S 5 and S 9 it will give a similarly broad training in elementary geology, as the dynamic phases of geology are emphasized on the excursions. Mimeographed outlines of the excursions are to be secured by each student desiring credit. See also a pamphlet, obtainable at the Cooperative Store, on *The Geography and Geology of the Cornell Region.* Professor LEIGHTON, Miss BROTHERHOOD, Miss VAN ORDER.

Those desiring University or entrance credit must take field notes and hand in written reports. Excursions 1, 2, 3, 4, 5, are required of all students in the course, and in addition for one hour's credit they must make their own choice, two of 7, 8, 11, or may substitute for these two, excursion 10.

Meeting place and time announced in mimeographed outlines or by bulletin. Meet for first excursion, Monday, July 13, at McGraw Hall, 2:15 p. m. or East Ithaca R. R. Station, 2:30 p. m. Excursions 1-5, Monday afternoons; 7, 8, 11, all day Saturday; 10 starts on Saturday. On the excursions to which a cost is attached, persons wishing to go must register at the department and secure tickets in advance of the date of the trip.

The longer excursions will be in charge of Professor LEIGHTON, with the co-operation and assistance of the other members of the instructing staff. On the excursions stops will be made at points of interest, explanations made, questions asked, and discussion invited.

OUTLINE OF EXCURSIONS: COURSE S 10

Monday Afternoons

1. **Eagle Hill.** To become acquainted with the lie of the land about Cornell, to learn the place names of the broader physiographic features, studying en route processes of weathering, and, at the summit, the maturely dissected plateau. The top of the hill is a vantage point from which a good view of the lake and the land for miles to the north, east, and west may be had. July 13.

2. **Fall Creek and Deadhead Hill.** To study the origin and nature of sedimentary rocks, also processes of erosion, transportation, deposition, and cementation. An intimate view of one of the large gorges and its special features, particularly Ithaca Falls. July 20.

5. **Terminal Moraine.** North Spencer. By train or auto-bus. To study a massive morainic loop, the basin in which the former ice tongue rested, and the outwash deposits and overflow channels to the south. Truncated valley sides due to glacial erosion. The most striking examples of glacial phenomena in the Cornell region. July 27.

3. **Shore of Cayuga Lake.** To study shore-line phenomena, joint planes, bedding, and stalactite formation. A walk for several miles along the east shore of the Lake. August 3.

4. **Portland Point.** By auto-bus. To study rock structure; intrusion of igneous rocks into sedimentary formations; rock-folding and small scale faulting and associated phenomena; vein-formation; fossil content of strata; economic utilization for cement. Report must be handed in not later than two days after the excursion. August 10.

All-day Excursions

7. **Taughannock Gorge and Falls.** By steamer. To study the Inlet Plain, its reclamation, the Barge Canal terminal, the position and succession of the Devonian strata along the lake shore and the deep gorge and falls of Taughannock, one of the highest straight falls east of the Rockies. Luncheon at the foot of the falls. July 18.

8. **Enfield Gorge and Falls; and Connecticut Hill.** By auto-bus. To study the relations of preglacial and hanging valleys and the postglacial and interglacial gorges, their origin and features. Joint-plane guidance of stream courses. A ride to the head of the gorge, climb through it to the lower end past the crest of Lucifer Falls. Enfield is perhaps the most picturesque and wildest of the gorges in the Cornell region. Luncheon at the head of the gorge. A ride to the top of Connecticut Hill, the highest point in the region. July 25.

Longer Excursions

10. **Niagara Falls and Gorge.** By train. Overnight at Niagara Falls. August 1. Open to all students in the Summer Session as far as accommodations are available.

All important scenic features of Niagara Falls and Gorge are visited and their physiographic history interpreted. As a whole these phenomena constitute a striking record of some of the most interesting chapters in the geologic and physiographic history of North America. Before the trip a special meeting of those interested will be held in the Physical Geography Laboratory, when the relations of the different places will be explained and illustrated by a large scale relief model of the Niagara region. Friday, July 31, 4:30 p. m. Students are advised to send to Director U. S. Geological Survey, Washington, D. C., for a copy of Niagara Folio, No. 190, in octavo form; cost, fifty cents in coin or money order.

11. **Watkins Glen.** By auto-bus. August 8. Open to all students in the Summer Session, as far as accommodations are available.

Watkins Glen is considered one of the most beautiful scenic spots in the country. It has been secured for a State park by New York and all parts of it made accessible. The excursion party will study the gorge, its pot holes and falls in de-

tail; and consider its relations to the Seneca Lake Valley in comparison with the conditions at Ithaca as related to the Cayuga valley. Ride across the dissected upland country to the south and west between Ithaca and Watkins.

S 12 a. Geography of New York State. Credit two hours. Daily except Sat., 12. *Physical Geography Laboratory.* Mr. ABRAMS. This is both a subject-matter and a method course; the *visual method* exemplified in teaching a definite part of the field of geography. Physiographic regions will be studied with a consideration of the adaptation of each for forestry, pasturage, agriculture, manufacturing, trade, transportation, and recreation. Attention will be called to the general principles of geography that are clearly illustrated in New York State. A distinction will be made between those facts and phenomena that may well be presented to younger pupils as units of measure and standards for comparison in the further study of geography and those to be reserved for upper grades. The work will be taken up somewhat as it might be in the elementary school, though more rapidly and with due recognition of the greater maturity of the members of the class. Full use will be made of screen pictures, photographs, maps, and books of reference, primarily with a view to illustrating how to study and teach geography.

GERMAN

S 1. First Year German. Credit four hours. Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. *GS 183.* Professor POPE.

Entrance credit, one unit.

After successfully completing this course, students can, by supplementary reading during the summer, prepare themselves for the fall entrance examination in second year German.

S 3. Third Year German. Credit four hours. Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. *GS 190.* Professor BOESCHE.

Entrance credit, one unit (third unit). Prerequisite two years of high school German or its equivalent.

S 4. Rapid Reading. Credit two hours. Daily except Sat., 9. *GS 183.* Professor BOESCHE.

Modern German literary prose texts will be read, translated, and discussed.

S 5. Lyric and Ballad Poetry. Credit two hours. Daily except Sat., 10. *GS 177.* Professor POPE.

The development of German lyric poetry from the Middle High German period to the present. Especial attention given to a literary appreciation of modern lyrics and ballads. Some time will be devoted to a study of German lyrics and ballads in the settings of modern German composers.

German Lectures and Readings. A series of lectures and readings in German will be given under the auspices of the Department of German on Wednesday evenings.

GOVERNMENT

S 1. American National Government. Credit two hours. Daily except Sat., 9. *GS 245.* Professor CUSHMAN.

Historical development, organization, powers, and practical working of the American National Government.

S 24. American Social Problems and the Constitution. Credit two hours. Daily except Sat., 11. *GS 245.* Professor CUSHMAN.

The nature of the police power of the national and the state governments. The constitutionality of social and economic legislation. Open to qualified juniors and seniors and to graduates.

HEALTH EDUCATION

S 1. Personal Hygiene (Teachers' course). Credit two hours. Daily except Sat., 8. *Stimson.* Dr. SMILEY.

A critical analysis of the scientific and unscientific material presented in the name of "Hygiene," with an attempt to cull out and discuss features of real

importance in the maintenance of health and in health teaching. Prerequisites suggested but not demanded, General Biology S 1, Human Physiology S 28.

S 2. Environmental and Group Hygiene (Sanitation and Public Health). Credit two hours. Daily except Sat., 12. *Stimson*. Dr. JENNETTE EVANS.

An informational course designed to treat in a general way community health problems and sanitation, and in a more specific way school sanitation and health problems involving the school group.

Prerequisites suggested but not demanded, General Biology S 1, General Bacteriology S 42.

S 3. Health Inspection of School Children. Credit two hours. Daily except Sat., 9. *Stimson*. Dr. JENNETTE EVANS.

A practical course of lectures and demonstrations designed to familiarize the student with the facts and methods necessary for making an effective health inspection of school children. Prerequisites suggested but not demanded, Human Physiology S 28, Human Anatomy.

S 4. The History and Principles of Health Education. Credit two hours. Daily except Sat., 2. *Old Armory*. Dr. SMILEY.

A general discussion of the history, methods, principles, and ramifications of health education in the schools and elsewhere. Prerequisites suggested but not demanded, Educational Psychology S 1, Principles of Education S 2, Personal Hygiene S 1, Environmental and Group Hygiene S 2.

HISTORY

S 1. Roman History. Credit two hours. Daily except Sat., 11. *GS 234*. Professor HYDE.

This course will be a general survey of the Mediterranean world under the rule of Rome. Although the main emphasis will be laid upon political history, the social, economic, and religious movements will also be discussed. Lectures, collateral readings, and discussions.

S 2. Greece in the Fifth and Fourth Centuries. Credit two hours. Daily except Sat., 12. *GS 221*. Professor HYDE.

After a brief survey of the preparatory work of the sixth century, this course treats in some detail the period from the Persian Wars to the death of Alexander. Particular attention is given to social conditions and to the development of culture.

S 3. Modern European History. Credit two hours. Daily except Sat., 10. *GS 242*. Professor BECKER.

A general treatment of the history of Europe since 1815.

S 4. The French Revolution. Credit two hours. Daily except Sat., 11. *GS 242*. Professor BECKER.

A descriptive survey of the institutions of France in the Old Régime, followed by a study of the Revolution from 1789 to 1795.

[S 5. **Modern European History.** Europe from the sixteenth century to 1815.] Not given in 1925.

[S 6. **The Napoleonic Era.**] Not given in 1925.

S 7. English History. From 1660 to the present. Credit two hours. Daily except Sat., 9. *GS 221*. Professor BELL.

A general course adapted to the needs of teachers and advanced students as well as of undergraduates. Lectures and assigned reading.

S 8. British Diplomacy since 1815. Credit two hours. Daily except Sat., 11. *GS 221*. Professor BELL.

A pro-seminary course open to teachers and advanced students.

S 11. American History, 1763-1860. Credit two hours. Daily except Sat., 10. *GS 234*. Professor BOYD.

A general course. After a brief consideration of the conditions which precipitated the War of Independence, the course of political and social development of

the United States will be traced with emphasis on political parties, sectionalism, expansion, and constitutional theories.

S 12. American History, 1860-1876. The Union, the Confederacy, and Reconstruction. Credit two hours. Daily except Sat., 12. GS 234. Prerequisite, one college course in American history or its equivalent. Professor BOYD.

This course consists of lectures, readings, and reports on political and constitutional questions in the United States during the Civil War, the problems of the Confederacy, and the readjustment, sectional and national, after 1865.

[S 13. **American History.** The Middle Period, 1815-1860.] Not given in 1925.

[S 14. **American Constitutional History.** A study of constitutional questions of present interest.] Not given in 1925.

S 17. Contemporary History and its teaching in the secondary schools. Credit two hours. Daily except Sat., 9. GS 234. Professor HICKMAN.

This course deals with the history of Europe since the war. The topics studied are the Peace Treaty; the conferences of the premiers; the conferences of the ambassadors; the League of Nations; England; France; Italy; Germany; Austria; Hungary; Czechoslovakia; Jugoslavia; and Poland. Both in method and in content the course will be useful to teachers in secondary schools, especially such as teach the courses in world history prescribed by the new history syllabus of the University of the State of New York.

LATIN

S 1. The Teaching of Latin. For teachers and those preparing to teach in high or preparatory schools. Lectures and discussions.

The objectives of Latin study in the schools; the content of the school courses; the methods and technique of instruction; the selection and proper use of textbooks; the use of auxiliary materials; the employment of the 'direct' method. The General Report of the Classical Investigation will be carefully examined and discussed. Daily except Sat., 9. GS 128. Credit two hours. Professor DURHAM.

S 2. The Contents of the Preparatory Curriculum in Latin. A review of some portions of Caesar and Virgil usually read in the high-school course, and a specific study of one or more of the orations of Cicero; a discussion, with adequate selections, of other authors suitable for class use during the high-school period. Daily except Sat., 11. GS 120. Credit two hours. Professor MOUNTFORD.

Primarily a study of third-year Latin for those already acquainted with the field. The course may however be undertaken by students who desire to secure the third unit of entrance Latin, but the third unit of entrance credit will not be granted unless supplementary work to the extent of five hours a week is likewise done to the satisfaction of the instructor in charge.

S 3. Latin Syntax. The chief difficulties and problems of Latin syntax, with an introduction to the history and development of the sounds, forms, and flexions of the Latin language. Daily except Sat., 10. GS 128. Credit two hours. Professor DURHAM.

S 4. Virgil. A study of his works in relation to the events of his times and to the development of Latin literature. The course, consisting partly of lectures and partly of readings of the text, will include a detailed treatment of the interpretative problems of the *Eclogues*, the purpose and technique of the *Georgics*, and the structure and composition of the *Aeneid*. Daily except Sat., 12. GS 120. Professor MOUNTFORD.

NOTE: Those who wish to begin their candidacy for the degree of Master of Arts are requested to correspond in advance with Professor DURHAM or Professor MOUNTFORD and to bring with them at the opening of the Summer Session such credentials of undergraduate work leading to the degree A.B., as will entitle them to admission to the Graduate School.

MATHEMATICS

In addition to the courses noted below, each teacher will have a daily office hour for consultation with students. It is urged that this opportunity be utilized by all concerned.

In the following list, courses S 1 to S 5 (b) are the equivalent of those having the same numbers in the *Announcement of the College of Arts and Sciences* for 1924-25.

Courses S 1, S 2, S 3 are planned for those teachers in the secondary schools who wish to review these subjects. They are equivalent to the advanced entrance requirements of Cornell University and of the College Entrance Examination Board. They presuppose a ready knowledge of elementary algebra (through quadratic equations) and of plane geometry. University credit for S 1, S 2, S 3, three hours each.

Students taking S 5 (a), S 5 (b) are requested to take no other University work during the session without special permission.

University credit for S 5 (a), S 5 (b), five hours each.

S 1. Solid Geometry. Daily, 11. *White 28.* Mr. RICHMOND. (Office hour, 10, *White 29*), *White 9.* Mr. SHAUB. (Office hour, 10, *White 23*.)

S 2. Advanced Algebra. Daily, 9. *White 27.* Professor SHARPE. (Office hour, 11, *White 29*.) *White 6.* Professor HURWITZ. (Office hour, 11, *White 8*.) *White 28.* Mr. RICHMOND. (Office hour, 10, *White 29*.)

S 3. Trigonometry. Daily, 10. *White 27.* Professor SHARPE. (Office hour, 11, *White 29*.) *White 25.* Professor HUTCHINSON. (Office hour, 11, *White 26*.)

S 5(a). Analytic Geometry and the Calculus (First term's work). Daily, 8 and 11. *White 10.* Assistant Professor CARVER. (Office hour, 9, *White 12*.) *White 21.* Mr. PORITSKY. (Office hour, 9, *White 23*.)

S 5(b). Analytic Geometry and the Calculus. (Second term's work). Daily, 8 and 11. *White 1.* Assistant Professor GILLESPIE. (Office hour, 9, *White 3*.) *White 5.* Assistant Professor CRAIG. (Office hour, 9, *White 4*.) *White 2.* Assistant Professor OWENS. (Office hour, 9, *White 4*.) *White 27.* Mr. BEISEL. (Office hour, 9, *White, 28*.)

S 20. Teachers' Course. Credit two hours. Daily except Sat., 11. *White 24.* Professor SNYDER. (Office hour, 10, *White 26*.)

The course will comprise selected topics in the subjects of secondary school mathematics, including constructions by ruler and compass and the solution of equations. The mutual dependence of algebra and geometry in the solution of problems will be emphasized.

ADVANCED COURSES

S 61. Projective Geometry. Credit three hours. Daily, 9. *White 24.* Professor SNYDER. (Office hour, 10, *White 26*.) The principles underlying projective forms of the first and second degrees will be developed. Although no knowledge of mathematics beyond plane geometry will be presupposed, additional training is highly desirable.

S 42. Analysis. Credit three hours. Daily, 10. *White 6.* Professor HURWITZ. (Office hour, 11, *White 8*.) A knowledge of the calculus is presupposed. The content of the course will vary from year to year, according to the needs and desires of the students. Correspondence from possible applicants for the course will be welcome. The subjects to be treated will generally be selected from the following list: elementary differential equations, theory of limits and logical foundations of the calculus, theory of point-sets, infinite series, theory of functions of a complex variable.

READING AND RESEARCH COURSES

In addition to the preceding courses, the teachers of mathematics offer the following opportunities to graduate students. Instruction will consist of conferences by appointment, direction of reading, and proposing definite problems for research.

Functions of a Complex Variable. Professor HUTCHINSON, Assistant Professor CRAIG.

Algebraic Curves and Surfaces. Problems in correspondence and birational transformations. Professor SNYDER.

Applied Mathematics. Problems in hydrodynamics: heat, electricity, and elasticity. Professor SHARPE.

Foundations of Geometry and Problems in Synthetic Geometry. Assistant Professors CARVER and OWENS.

Functions of a Real Variable, Point-sets, Calculus of Variations. Assistant Professor GILLESPIE.

Advanced Analysis. Problems in the theory of functions, differential equations, and integral equations. Professor HURWITZ.

MUSIC

S 10. Harmony. Credit two hours. Daily except Sat., 8. *Barnes Hall.* A course dealing with the construction and interconnection of triads and chords of the seventh. Assistant Professor H. D. SMITH.

S 14. Musical Appreciation, Form, and Design. Credit two hours. Daily except Sat., 10. *Barnes Hall.* Professor KINKELDEY.

A discussion of musical style; form and content in music. The course is intended to furnish a rational basis for the appreciation of musical masterpieces of all schools.

S 18. History of Modern Music. Credit two hours. Daily except Sat., 12. *Barnes Hall.* Professor KINKELDEY.

The development of music from Bach to the present day.

S 20. Music in the Public Schools. Credit two hours. Daily except Sat., 9. *Barnes Hall.* Mr. SEITZ.

An introduction to the general problem of school music: its value as an educational subject; principles underlying classroom methods; practical suggestions for elementary and high school situations.

S 21. General Problems of Music Supervisors. Credit two hours. Daily except Sat., 11. *Barnes Hall.* Mr. SEITZ.

A discussion of the problems of the supervisor; evaluation of methods and materials; comparison and contrast of systems and textbooks in current use.

Chorus. The Department of Music will organize and maintain a choir for the services in Sage Chapel at 11 o'clock each Sunday morning during the Summer Session. The individual tests for this choir will be held in Sage Chapel on Monday July 6 from 9:30 to 12:30 and 2:30 to 5:00. The rehearsals will be held on Thursday at 5 o'clock and on Sunday at 10. All students having voices and desiring to sing are urged to become members of this choir.

PHILOSOPHY

S 1. The Renaissance. Daily except Sat., 9. *GS 225.* Credit two hours. Professor HAMMOND.

Studies in the civilization of the Renaissance with special reference to the fine arts, the rise of humanism, and the beginnings of modern philosophical and political theories.

S 2. The Development of Modern Philosophical Thought. Daily except Sat., 10. *GS 225.* Credit two hours. Professor THILLY.

This is a course in the history of modern philosophy, covering the same ground as that given during the second term of the regular year. It will, however, be somewhat less technical than that course, and will emphasize the connection of philosophy during the modern period with literary, scientific, political, and social movements.

S 3. Greek Civilization. Daily except Sat., 11. *GS 225.* Credit two hours. Professor HAMMOND.

A history of the chief Greek systems of philosophy and their survival in the Roman Empire and in Christian civilization. Particular attention will be given to the Greek ideals of life as expressed in their literature, art, and political theory and practice.

S 4. Ethical Ideas, Ideals, and Philosophies. Daily except Sat., 12. *GS 225.* Credit two hours. Professor THILLY.

A study of the development of moral conceptions in its relation to human institutions.

PHYSICAL EDUCATION

Swimming. Instruction in swimming and life saving for individual training and for teaching will be given at hours to be arranged for each applicant by appointment. For this instruction a special charge of ten dollars is made. For women, *Sage College Gymnasium*. 9-12 A. M., 2:30-5 P. M. For men, *Armory Gymnasium*, by appointment. Mr. GÉLAS.

PHYSICS

Demonstration Lectures. A series of experimental demonstrations covering the entire field of Physics. Little time will be spent on the development of the related theory, this being left for the classroom work of the courses described below. Teachers may find in these demonstrations valuable suggestions for their own work. These lectures are a required part of courses S 3 and S 6. Daily, 8. *Rockefeller A.* Professor GIBBS.

S 3. Introductory Experimental Physics. Credit six hours. Demonstration lectures, recitations, and laboratory work. Lectures, daily, 8. *Rockefeller A.* Recitations, daily, 9; quiz, M, 10-12. *Rockefeller 109.* Professor GIBBS. Laboratory, three two-hour periods a week. Section A, M, 2-4 and T Th, 10-12; Section B, W F, 10-12 and Th, 2-4. *Rockefeller 220.* Messrs. FORD and ZELLER.

S 6. Introductory Physics. Credit six hours. Demonstration lectures and recitations. Prerequisites, Mathematics S 1, S 2, and S 3, or their equivalent. Lectures, daily, 8. *Rockefeller A.* Recitations, daily, 12; quiz, M, 10-12. *Rockefeller 107.* Assistant Professor COLLINS.

S 9. General Physics. Credit two hours. Theory and problems covering selected topics in light and electricity. It is recommended that Physics S 65 be taken simultaneously with Physics S 9. Prerequisites, Physics S 6 or its equivalent, and calculus. Recitations, daily except Sat., 8. *Rockefeller 106.* Assistant Professor BIDWELL.

S 14. Physical Measurements. The schedule of experiments comprising this course may be taken in Physics S 65, which see.

S 55. Physical Experiments. Credit two hours. For teachers of elementary physics and for others wishing a greater familiarity with laboratory work. T W Th F, 9-11:30. *Rockefeller 300-B.* Assistant Professor TUCKER.

A general laboratory study of the fundamental physical laws and constants, partly from the qualitative, partly from the quantitative point of view. The work may be varied to suit the interest of the student, since the instruction is in all cases individual. This course presupposes a knowledge of introductory physics.

S 65. Physical Measurements. Credit one to four hours. Primarily for teachers and students who wish a thorough introduction to the theory and methods of physical measurements. Prerequisites, the equivalent of eight hours of college Physics and a knowledge of the elements of calculus. One to four three-hour periods a week. M W F, 2-5 and T Th, 9-12. *Rockefeller 252.* Assistant Professor BIDWELL and Mr. MERTZ.

The methods of setting up and adjusting apparatus, the study of sources of error and their elimination, methods of computation, the interpretation of results, both analytically and graphically, have special emphasis. The instruction is individual and the topics covered may be adjusted to meet the needs of the student.

S 90. Teachers' Course. Credit two hours. Lectures, discussions, and conferences, with emphasis upon the selection, organization, and presentation of subject-matter and practice in the care and manipulation of apparatus in classroom and laboratory. Daily except Sat., 9. *Rockefeller 108.* Mr. ZELLER.

Conferences, individual or by groups, may be arranged for the discussion of practical problems suggested by members of the class. Teachers are advised to bring with them a copy of the textbook which they are using.

S 106. Advanced Laboratory Practice. Open to students who have had Physics S 65 (four hours of credit) or its equivalent. Credit varies with the

amount of work done. The laboratory is open daily except Sat., 9-12. *Rockefeller* 301. Assistant Professors COLLINS and TUCKER.

This course is intended to meet the requirements of the following classes of students: (1) those wishing to take up special topics for detailed study; (2) those taking Course S 112 or S 121 and desiring to supplement that work in the laboratory; (3) those who wish to develop their laboratory technique in preparation for research.

[The sequence of courses S 111 to S 140 is intended to run through three summer sessions. The schedule for the next three summers is: 1925, S 121 and S 112; 1926, S 122 and S 140; 1927, S 130 and S 111. The courses are of the same general character as the corresponding courses given in the fall and spring terms but include somewhat fewer topics. The selection of these topics will be influenced by the interests and needs of the class. To profit by these courses a student should have a knowledge of calculus and should have completed courses in general physics covering the principal topics of the subject. A student who contemplates electing any of these courses is advised to correspond with the department about his preparation for the work. These courses, as also S 106, S 415, and S 475, may be taken for credit toward a master's degree in Physics, subject to the requirements of the graduate school. See the *Announcement of the Graduate School*.]

[S 111. **Mechanics.**] Not given in 1925.

S 112. **Properties of Matter.** The analysis of stresses and strains and some applications; surface tension; the motion of fluids and the effects of viscosity. Text: McEwen's *Properties of Matter*. Daily except Sat., 8. *Rockefeller* 107. Assistant Professor KENNARD.

S 121. **Electricity and Magnetism.** Credit two hours. Electrostatic and magnetic fields; direct current phenomena; gaseous, electrolytic, and metallic conduction; chemical and thermal electromotive forces. Daily except Sat., 12. *Rockefeller* C. Assistant Professor TUCKER.

[S 122. **Electricity and Magnetism.** Electromagnetism, variable current phenomena, electric oscillations.] Not given in 1925.

[S 130. **Light.** Geometrical optics; thick lenses; optical instruments. Physical optics: interference, diffraction, polarization.] Not given in 1925.

[S 140. **Heat.** Thermometry; heat transfer; equations of state; kinetic theory of gas and thermodynamics.] Not given in 1925.

S 415. **Special Topics for Investigation.** Students who are prepared to profit by the use of the library and laboratory facilities of the department in the study of some special topic or in investigation will be given an opportunity to do so. This work may be taken in connection with or independently of any of the above courses and will be under the direction of one or more members of the staff, with whom frequent conferences should be arranged. Credit varies with the nature and amount of work done.

For further information regarding opportunities for research and investigation during the summer see the *Announcement of the Graduate School*.

S 475. **Radiation and the Quantum Theory.** Credit two hours. Prerequisite, a thorough general course in physics and calculus. Daily except Sat., 2. *Rockefeller* 106. Assistant Professor KENNARD.

Lectures and assigned readings. The invention of the quantum theory to explain black-body radiation and its applications to specific heats and to spectra; the emission of radiation in the form of electric waves, light and X-rays, and the effects of its absorption, including the phenomena of photo-electricity.

PSYCHOLOGY

S 1. **Psychology.** Credit two hours. Lectures, M T W Th, 9. Professor TITCHENER. Recitations, F 9. GS C. Assistant Professor HOISINGTON, Mr. BIXBY, and Mr. FELDMAN.

This course furnishes a general introduction to the study of the normal human mind from the experimental point of view. It opens with a brief discussion of the nature of a scientific psychology, of the problems which such a psychology is

called upon to face, and of the methods at its disposal for their solution. It then sets forth in order the facts and laws of mental life as indicated by experiment, beginning with sensation, image, and affection; it passes by way of attention, perception, association, and memory to the highly complex processes of imagination, voluntary action, and thought. Throughout the work use will be made of the unique collection of demonstrational apparatus which composes the equipment of a special laboratory in Goldwin Smith Hall.

Textbook: Titchener, *Textbook of Psychology*.

S 2. Attention. Credit two hours. Daily except Sat., 10. GS C. Professor WELD.

In this course the applications of attention to advertising, to conjuring and sleight of hand, to hypnosis, to testimony, to efficiency, and to learning, will receive special emphasis. The application will, however, be made only after the student has been grounded in the elementary facts and laws of attention. The development, the conditions, the kinds, and the levels of attention will first be considered; then the experimental investigations will be reviewed; and thereafter the practical considerations will be taken up.

Demonstrations and class-experiments will be used frequently for illustration. No textbook will be prescribed, but the lectures will be supplemented by assigned readings in standard works.

S 3. Memory and Learning. Credit two hours. Daily except Sat., 8. GS C. Assistant Professor HOISINGTON.

The chief topics to be treated in this course are: the general nature of memory; the curve of learning; the conditions of impression, association, recall, and recognition; the correlation between different memories and between memory and other mental functions; teaching and the presentation of material; recitation and examination; "cramming" and efficient study; unusual memories and their conditions; the formation and the breaking of habits; mnemonic schemes and the "training" of memory.

Demonstrations and class-experiments will be made throughout the course. Readings will be assigned in standard texts and monographs to be found in the library.

S 4. Qualitative Laboratory. Credit two hours. M W F, 2:00-4:30. *Psychological Laboratory, Morrill Hall.* Assistant Professor HOISINGTON and Mr. BIXBY.

The purpose of this course is to furnish the student training in psychological method, and to give him a first-hand acquaintance with the contents of his own mind. The laboratory consists of twenty-seven rooms on the upper floors of Morrill Hall, including dark rooms, workshops, and offices. The equipment on the side of apparatus is especially complete, embracing besides the standard pieces for qualitative experiments a great variety of special instruments. The equipment of the research laboratory is also available for demonstrations. Experiments will be performed in vision, audition, and the other departments of sense, in feeling, attention, perception, and idea, and toward the end of the work the student may carry out experiments upon the more complex processes of association and action. The textbook is Titchener's *Experimental Psychology*, vol. i, Qualitative Student's Manual.

S 5. Quantitative Laboratory. Credit two hours. Three afternoons (to be arranged), 2:00-4:30. *Psychological Laboratory, Morrill Hall.* Professor WELD.

This course aims to furnish such training in the psychological methods and in the handling of instruments of precision as will be adequate preparation for research problems. The students will make experimental determinations of the stimulus limens, will attempt verifications of Weber's Law in various departments of sense, and will perform at least one experiment by each one of the chief psychophysical methods. Quantitative experiments in special fields may be undertaken in so far as time permits. Textbook is Titchener's *Experimental Psychology*, vol. ii, Quantitative Student's Manual.

Laboratory partnerships must be formed if the work of this course is to be pursued with profit. If, therefore, a partner cannot be found, the student is recommended to register in course S 7.

S 6. Technique of the Laboratory. Hours (three) to be arranged. *Psychological Laboratory, Morrill Hall.* Mr. BIXBY.

This course will discuss the equipment of a psychological laboratory, in the various fields of investigation and at various levels of expense. Demonstrations, with special emphasis upon principles of construction, will be given of standard pieces of apparatus contained in the Cornell University laboratories.

S 7. Experimental Problems. Hours and credit to be arranged. *Psychological Laboratory, Morrill Hall.* Professor WELD, Assistant Professor HOISINGTON, Mr. BIXBY, and Mr. FELDMAN.

Courses S 1, S 4, and S 5, or their equivalents, are prerequisites for this course. The work will consist of the original study of certain experimental problems, and will involve both observation and manipulation of instruments. Completed investigations may be published in *The American Journal of Psychology*.

S 8. Brentano's Psychology: Advanced Course. Daily except Sat., 11. GS C. Professor TITCHENER.

This course presupposes S 1 and S 4 or their equivalents. Brentano's *Psychologie vom empirischen Standpunkte* will be read by the class, and the author's influence upon modern psychology will be discussed and illustrated.

Those who intend to take the course should bring a copy of the *Psychologie* with them.

PUBLIC SPEAKING

ORAL ENGLISH: SPEECH TRAINING: DRAMATICS

All summer courses are planned to meet the special needs of teachers.

Students should register with the individual instructors, who will be in their offices on registration day and on the first day of instruction. For further details about registration consult Assistant Professor MUCHMORE, GS 23.

S 1a. Public Speaking. Credit two hours. Three sections: daily except Sat., 8. GS 21. Assistant Professor HUNT; daily except Sat., 11. GS A. Assistant Professor WICHELS; daily except Sat., 12. GS A. Mr. HANNAH.

A practical training for speaking in public. Study of delivery, of methods of preparation, and of rhetorical forms, with practice in the delivery of various types of original speeches, and of declamations. High-school teachers will find the methods applicable to their work in public speaking and oral English. Regular students passing S 1a are admitted to the second term of Public Speaking 1.

S 1b. Argument and Debate. Credit two hours. Daily except Sat., 9. GS A. Assistant Professor WICHELS.

A study of the principles of conviction and persuasion: training in analysis, in the use of evidence, in brief-drawing, and in rhetorical presentation, with practice in debating and drill in delivery. S 1b will be considered equivalent to the second term of Public Speaking 1.

S 3. Teachers' Course in Oral English and Public Speaking. Credit two hours. Daily except Sat., 12. GS 26. Assistant Professor HUDSON.

For secondary school teachers of English and public speaking. Approved by the New York State Department of Education as a course in methods creditable toward the teachers' certificate. Aims, problems, standards, and methods in oral English, public speaking, and speech training.

S 4. Rhetorical Theory. Credit two hours. Daily except Sat., 10. GS 26. Assistant Professor HUNT.

For graduates and qualified undergraduates. The rhetorical theory of Aristotle, Quintilian, Bacon, Bain, DeQuincey, Whateley, and Spencer in relation to persuasive discourse.

S 8. Voice Training. Credit one hour. Daily except Sat., 10. GS 21. Mr. THOMAS.

A fundamental course for teachers of oral English and public speaking. Exercises for the development of pure tone, flexibility, melody and strength of voice, clear enunciation; training for poise and ease of action.

S 9. Teachers' Course in Speech Training. Credit two hours. Daily except Sat., 11. *GS 21.* Assistant Professor MUCHMORE.

For secondary and elementary school teachers. A study of English phonetics, voice training, pronunciation, the principles of oral expression, and the improvement of speech.

S 8a. Principles of Voice Training and Speech Correction. Credit two hours. Hours to be arranged. Assistant Professor MUCHMORE.

For graduates and other students having sufficient preparation for independent work. Readings in the sciences underlying voice-training and speech-correction, with a critical survey of theories and methods.

S 10. Oral Interpretation of Literature. Credit two hours. Two sections: daily except Sat., 10. *GS A.* Mr. HANNAH; daily except Sat., 12. *GS 21.* Assistant Professor MUCHMORE.

Principles of reading, and oral interpretation of literature.

S 30. Dramatic Production. Credit two hours. Daily except Sat., 9. *GS 26.* Daily except Sat., 11. *GS 26.* A special section for students in the Summer School of Agriculture. Assistant Professor HULTZEN.

Theory of stage direction; choice of plays; practical phases of production; one-act plays rehearsed; practice with the Summer Theatre. Students in S 30 are advised to take S 10.

S 19. Pageantry. Credit two hours. Daily except Sat., 10. *Roberts Assembly.* Assistant Professor HUDSON. See the *Announcement of the Summer School of Agriculture.*

S 35. Dramatic Art. Credit two hours. Hours to be arranged. Professor DRUMMOND.

For graduates and other students prepared for advanced work in the theory of the theatre.

S 40. Seminary. Hours to be arranged. Assistant Professor WICHELNS. For graduates engaged in the study of special subjects in rhetoric and public speaking.

The Summer Pageant. Under the direction of Assistant Professor HUDSON.

The pageant presented under the auspices of the Department of Rural Organization and of the Summer Theatre will provide practice for members of the course in Pageantry; members of the course in Dramatic Production are invited to assist.

The Summer Theatre. Under the direction of Professor DRUMMOND. Assistants: Mr. WOHL, Mr. HERRICK, Mr. DUNHAM, and Miss KEANE.

During the Summer Session weekly performances will be given by the student repertory Summer Theatre Company. Qualified members of the courses in Dramatic Production may assist in the work of the Theatre.

ROMANCE LANGUAGES

FRENCH

S 1. Elementary Course. Credit four hours. Daily except Sat., 8 and 12. *GS 290.* Mr. HEAD.

Entrance credit, one unit.

The object of this course is twofold: first, to give beginners a thorough drill in the essentials of French pronunciation, grammar, and reading; second, to offer to teachers an opportunity of studying the methods of presentation of these subjects to beginners.

S 2. Intermediate Course. Credit four hours. Daily except Sat., 8 and 12. *GS 283.* Mr. GILLE.

Entrance credit, one unit. Prerequisite course S 1 or its equivalent.

S 3. Advanced Course. Credit four hours. Daily except Sat., 8 and 12. *GS 227.* Mr. BALLY.

Entrance credit, one unit. Prerequisite S 2 or its equivalent.

S 4. Advanced Translation. Credit two hours. Daily except Sat., 9. *GS 290.* Prerequisite course S 3 or its equivalent. Mr. BALLY.

S 5. Elementary Composition and Conversation. Credit two hours. Daily except Sat., 11. *GS 290.* Prerequisite course S 3 or its equivalent. Mr. GILLE.

S 9. Advanced Composition and Conversation. Credit two hours. Daily except Sat., 8. *GS 245.* Associate Professor MORAUD.

Rapid translation from standard English texts into French; frequent theme-writing. This course is conducted in French.

S 21. Contemporary French Novel. Credit two hours. Daily except Sat., 11. *GS 283.* Professor MASON.

Lectures and discussions of special topics in the contemporary novel with extensive outside reading and reports.

[S 23. **Introduction to French Philology.** Credit two hours. Professor PUMPELLY.] Not given in 1925.

S 30. The Teaching of French. Credit two hours. Daily except Sat., 10. *GS 283.* Mr. HEAD.

A detailed discussion of the more modern methods of teaching French. Lectures, assigned reading, and observation.

S 31. Phonetics. Credit two hours. Daily except Sat., 9. *GS 283.* Professor MASON.

Lectures on the basic phonetic laws of French and English; practical exercises in phonetic transcription. This course is especially for teachers of French but is open to all students who wish to study the pronunciation of French.

S 34. The Classical Drama. Credit two hours. Daily except Sat., 10. *GS 227.* Associate Professor MORAUD.

Lectures in French on the classical drama. Some of the more important plays will be read in the class.

S 35. France of Today. Credit two hours. Daily except Sat., 12. *GS 264.*

Lectures in French on the social, intellectual, and political life of the present.

S 47. French Seminary. M W F, 10. *French Seminary Room, Library.* Professor MASON.

Discussion of special topics in the field of modern French literature. This course is especially for graduate students and candidates for the degree of Master of Arts.

French Readings. A series of readings in French will be given by Mademoiselle COURTOIS daily except Saturday at 2.15 p. m. in the Drawing Room of Sill Cottage.

French Lectures. A series of lectures in French dealing with French national life will be given by the members of the instructing staff in French on Wednesday evenings at 8 o'clock in *Goldwin Smith Hall*, Room 290.

La Maison Française. The Sill Cottage, situated on the Campus, is reserved for students of French. Mademoiselle Courtois is in charge and only French is spoken in the Cottage. Reservations should be made before June 1. In the dining room of Sage College, special tables where only French is spoken, are reserved for students of French. Students of French will find abundant opportunity for speaking French at the frequent social meetings held under the direction of Mademoiselle COURTOIS.

SPANISH

S 1. Elementary Course. Credit four hours. Daily except Sat., 8 and 12. *GS 277.* Dr. BERKOWITZ.

Entrance credit, one unit.

S 2. Intermediate Course. Credit four hours. Daily except Sat., 8 and 12. *GS 281.* Mr. KINGERY.

Entrance credit, one unit.

S 3. Advanced Course. Credit four hours. Daily except Sat., 8 and 12. *GS 124.* Mr. VILLAFRANCA.

Entrance credit, one unit.

S 4. **Advanced Translation.** Credit two hours. Daily except Sat., 9. *GS 277.* Mr. KINGERY.

S 5. **Elementary Composition and Conversation.** Credit two hours. Daily except Sat., 11. *GS 281.* Dr. BERKOWITZ.

S 7. **Advanced Composition and Conversation.** Credit two hours. Daily except Sat., 11. *GS 277.* Mr. VILLAFRANCA.

Special attention will be given to free composition and correspondence. The course is conducted in Spanish.

S 10. **Masterpieces of Spanish Literature.** Credit two hours. Daily except Sat., 9. *GS 281.* Professor KENISTON.

Lectures, outside reading, and discussion.

S 30. **The Teaching of Spanish.** Credit two hours. Daily except Sat., 10. *GS 281.* Professor KENISTON.

A course for the discussion of materials and methods in the presentation of Spanish in the secondary schools. Special attention will be given to phonetics, classroom methods, the choice and use of texts, and auxiliary materials.

Spanish Lectures and Readings. A series of lectures and readings in Spanish by members of the instructing staff will be given during the session.

SUMMER SESSION OF THE COLLEGE OF LAW

The summer session of the College of Law will begin on Monday, June 22, and end on Friday, September 4, 1925. The session will be divided into two terms of five and one-half weeks each. The second term will begin on Thursday, July 30.

FACULTY

LIVINGSTON FARRAND, A.M., M.D., L.H.D., LL.D., President of the University.
GEORGE GLEASON BOGERT, A.B., LL.B., Dean of the College.
HORACE EUGENE WHITESIDE, A.B., LL.B., Secretary of the College.

RALPH WILLIAM AIGLER, LL.B., Professor of Law in the University of Michigan Law School.

GEORGE GLEASON BOGERT, A.B., LL.B., Professor of Law in the Cornell University College of Law.

CHARLES KELLOGG BURDICK, A.B., LL.B., Professor of Law in the Cornell University College of Law.

CHARLES EDWARD CLARK, A.B., LL.B., M.A., Professor of Law in the Yale University Law School.

FELIX FRANKFURTER, A.B., LL.B., Professor of Law in the Harvard Law School.

JAMES WIGGINS SIMONTON, A.B., J.D., S.J.D., Professor of Law in the University of Missouri School of Law.

ROBERT SPROULE STEVENS, A.B., LL.B., Professor of Law in the Cornell University College of Law.

HORACE EUGENE WHITESIDE, A.B., LL.B., Assistant Professor of Law in the Cornell University College of Law.

EDWARD ECKER WILLEVER, LL.B., Librarian.

COURSES OF INSTRUCTION

Contract. Assistant Professor WHITESIDE. Huffcut and Woodruff's *Cases on Contract*. (4th ed.). Eight hours a week, both terms. Credit six hours.

Property 1a. Professor BOGERT. Bigelow's *Cases on Personal Property*. Six hours a week, first term. Credit two hours.

Agency. Professor STEVENS. Huffcut's *Cases on Agency* (2nd. ed.). Six hours a week, second term. Credit two hours.

Administrative Law. Professor FRANKFURTER. Six hours a week, first term. Credit two hours.

Trade-Regulation. Professor FRANKFURTER. Kale's *Cases on Contracts and Combinations in Restraint of Trade*. Six hours a week, first term. Credit two hours.

Code Pleading. Professor CLARK. Hinton's *Cases on Code Pleading*. (2nd. ed.). Eight hours a week, first term. Credit three hours.

Conflict of Laws. Professor STEVENS. Lorenzen's *Cases on Conflict of Laws* (2nd. ed.). Eight hours a week, first term. Credit three hours.

Law of Public Service. Professor BURDICK. C. K. Burdick's *Cases on Public Service and Carriers*. (2nd ed.). Six hours a week, first term. Credit two hours.

Negotiable Paper. Professor AIGLER. Britton's *Cases on Negotiable Instruments*. Eight hours a week, second term. Credit three hours.

Sales. Professor BOGERT. Woodward's *Cases on Sales*. (2nd. ed.). Eight hours a week, second term. Credit three hours.

Mortgages. Professor SIMONTON. Durfee's *Cases on Mortgages*. Six hours a week, second term. Credit two hours.

Bankruptcy. Professor SIMONTON. Williston's *Cases on Bankruptcy*. (2nd. ed.). Six hours a week, second term. Credit two hours.

SUMMER SCHOOL OF BIOLOGY

Under the auspices of the Summer Session of Cornell University and of the Summer School of the New York State College of Agriculture.

Students attending the School of Biology must register both in the Summer Session and in the Summer School of Agriculture, paying, however, but one tuition fee of fifty dollars.

STAFF OF INSTRUCTION

JAMES CHESTER BRADLEY, Ph.D., Professor of Entomology (Taxonomy).
PAUL RUFUS BURKHOLDER, A.B., Assistant in Botany.
OTIS FREEMAN CURTIS, Ph.D., Professor of Botany (Physiology).
JOSEPH ALMA DYE, Ph.D., Instructor in Human Physiology.
ARTHUR JOHNSON EAMES, Ph.D., Professor of Botany (Anatomy).
HARRY MORTON FITZPATRICK, Ph.D., Professor of Plant Pathology (Mycology).
ALLAN CAMERON FRASER, Ph.D., Assistant Professor of Plant Breeding.
ADELE LEWIS GRANT, Ph.D., Instructor in Botany (Taxonomy).
WILLIAM ARTHUR HAGAN, D. V. M., Professor of Pathology and Bacteriology.
ROBERT MATHESON, Ph.D., Professor of Entomology.
MERVYN CHARLES MOSSOP, B. S., Assistant in Entomology.
WALTER CONRAD MUENSCHER, Ph.D., Assistant Professor of Botany.
HERBERT HICE WHETZEL, A.B., Professor of Plant Pathology.
HUGH DANIEL REED, Ph.D., Professor of Zoology.
BENJAMIN PERCY YOUNG, Ph.D., Assistant Professor of Zoology.

GENERAL PLANS AND AIMS

The Summer School of Biology was organized to provide instruction of the highest grade in zoology, botany, and allied subjects. All the regular facilities of the University are at the disposal of the student, and as far as possible the staff has been restricted to teachers of professorial rank in the University. The courses are for the most part those given during the regular academic year condensed into a period of six weeks, but not abridged. The work is particularly planned to meet the needs of teachers and graduate students who wish to know, in addition to the subject matter, something of the methods and sources in teaching; but undergraduates also, if sufficiently prepared, will find the courses adapted to their needs. Intensive rather than extensive work is necessarily expected of each student, as the courses are comprehensive. These courses lead toward advanced degrees, and special attention is given to graduate students pursuing research. Students interested in graduate study should, if possible, consult by letter with Professor Wiegand, or the professor concerned, before coming to Ithaca.

The intensive interest in Biology at Cornell University over a period of years has resulted in a wealth of laboratory material. Very extensive and in some cases unique collections of both plants and animals, and a very complete working library, are available to students prepared to make use of them. Ithaca is located in the Finger Lakes region of Central New York, noted not only for its picturesque

beauty, but for its richness in biological material of both plants and animals. In this respect the University is perhaps not excelled by any other institution in the country. The collecting grounds are for the most part adjacent to the campus, and can be very readily visited. Within easy reach of the laboratories are freshwater marshes and lakes, salt springs, marl springs, marl bogs, peat bogs, extensive ravines with numerous waterfalls, and upland woods or fields overlying either calcareous or noncalcareous sandy or heavy soils. The country shows a considerable variation in elevation, thus giving samples of several life zones. It is therefore possible to use as illustrative material those inland organisms which may be obtained most readily by teachers throughout the country for use in their own classes.

[A limited amount of change in the hours scheduled may be made by the staff at the beginning of the session to avoid conflicts. In the case of morning laboratories the student may obtain permission, at the option of the instructor, to be absent for a period to attend a lecture in some other course. The time so lost is to be made up later.]

COURSES DEALING PRIMARILY WITH PLANTS

S 1. General Botany. Credit six hours. Equivalent to Botany 1. Lectures, M T W Th F, 8. Laboratory, M T W Th F, 9-12, W, 2-4:30. Recitations or conferences, T Th, 2-5, and at least two all-day field trips. *Stone.* Assistant Professor MUENSCHER and Mr. BURKHOLDER.

This course is designed to furnish a general knowledge of the fundamental facts and principles of plant life. A careful study is made of form, structure, and reproduction of representatives from the principal groups, with a view to orient the student in the plant kingdom, and to acquaint him with the principal evolutionary tendencies exhibited. Considerable attention is given to life processes, particularly in the higher plants, and to information necessary in the prosecution of more advanced or practical work connected with plants and animals. Laboratory fee, \$5.00.

S 2. Plant Physiology. Credit four hours. Equivalent to Botany 20. Prerequisite course 1 or its equivalent, chemistry, and permission to register. Lectures, M T W Th F, 12. Laboratory, T W Th F, 9-12. *Stone.* Professor O. F. CURTIS.

This course is designed to acquaint the student with the general principles of plant growth. Topics such as water-relations, photo-synthesis, translocation, digestion, respiration, mineral nutrition, and reproduction are studied in some detail and particular emphasis is placed both in laboratory and classroom on discussions of the principles and their application to growing plants. Laboratory fee, \$4.00; deposit, \$2.00.

S 3. Taxonomy of Vascular Plants. Credit four hours. Equivalent to Botany 6. Prerequisite course 1 or its equivalent. Lectures, M T W Th, 11. Laboratory, M T W Th, 2-5. Several all-day field trips will be arranged. *Stone.* Dr. GRANT.

A study of the kinds of seed plants and ferns; their classification into genera, families, and orders; and field work on the local flora. Emphasis will be placed on wild plants, but the more common cultivated plants will receive some attention. The course is planned to follow Course 1 and to furnish an introduction to the knowledge of field botany and to the classification of the higher plants in preparation for special work in various departments and as an aid in teaching. Instruction will be given in herbarium methods. Laboratory fee, \$4.00; deposit, \$3.00.

S 4. Comparative Morphology of Fungi. Credit four hours. Equivalent to Mycology 6. Prerequisite course 1 or its equivalent and permission to register. Lectures, M T W Th F, 9. *Bailey, West Basement.* Laboratory, fifteen actual hours a week, by arrangement. *Bailey, East Basement.* Professor FITZPATRICK.

An elementary synoptical course designed to acquaint the student with the general field of mycology. Emphasis is placed on morphology and phylogeny, rather than on taxonomy, but abundant opportunity is given for field work. Laboratory fee, \$6.00; deposit, \$3.00.

S 5. Plant Anatomy. Credit four hours. Prerequisite course S 1 (Botany 1) or an equivalent and permission to register. Laboratory, M T W Th F, 8-11:30. Hours for lectures and recitations will be arranged during these periods. *Stone 203.* Professor EAMES.

This course is designed to give a working acquaintance with the internal morphology of vascular plants, and emphasis is placed on practice in interpretation and determination of material. It is planned not only for students desiring training in botany, but also for those in applied fields, such as pathology, pomology, and genetics. Laboratory fee, \$5.

S 10. General Plant Pathology. Credit four hours. Equivalent to Plant Pathology 1. Prerequisite course 1 or its equivalent and permission to register. Lectures, M W F, 7 a. m. Laboratory work; the completion of a minimum of twenty exercises requiring not less than twenty actual hours a week, with personal conferences of half an hour each. Conferences by arrangement. Laboratory at the student's convenience. Professor WHETZEL.

A fundamental course treating of the nature, cause, and control of plant diseases illustrated by studies of the commoner diseases of cultivated crops. Admission limited to twenty students. Laboratory fee, \$4.50; deposit, \$3.00.

S 19. Special Problems With Plants. Credit two or more hours. Hours to be arranged.

Students who are sufficiently prepared may arrange to engage in the study of some problem or special topic. Such work may lie in the fields of general or taxonomic botany, mycology, cytology, plant physiology, or plant pathology. A member of the staff must supervise the work.

COURSES DEALING PRIMARILY WITH ANIMALS

S 20. General Zoology (Animal Biology). Credit six hours. Lectures, M T W Th F, 9. *McGraw 5.* Laboratory, M T W Th F, 2-5. *McGraw 2A.* Field studies to be arranged. Professor REED.

This course is planned to give a comprehensive view of Animal Biology, taking the living complex animal, including the biological nature and relations of man, as the objectives of the study. Leading toward this objective there will be considered the principles of structure, function, and origin, and the application of general biological principles to animal perfection. The study of animals in their relations as living things will be emphasized. Animal types and their classification are employed as a service base from which study may proceed. Laboratory fee, \$3.00.

[S 21. **Systematic Vertebrate Zoology and Ecology.** Credit four hours. Lectures, Th F, 9 and 12. *McGraw 7.* Laboratory and field work, Th F, 9-12, 2-5, W, 9-1. Some all-day trips are required. Occasionally a field trip 5:30-8 a. m. or 5-8 p. m. may be substituted for the regular periods.] Not given in 1925.

S 22. Invertebrate Zoology. Credit four hours. Prerequisite Zoology S 20 or its equivalent in a general course in zoology or animal biology. Lectures, M T W Th F, 8. *McGraw 5.* Laboratory and field work, preferably, M T W Th F, 9-11:30, but in case of necessity these periods may be arranged for other hours. *McGraw 2B.* Assistant Professor YOUNG.

This course is planned for those who, having a knowledge of the general field of zoology, desire an opportunity of becoming more intimately acquainted with invertebrate forms. The lectures and laboratory periods will deal with the structure, development, and the application of biological principles to this group of animals. Field trips will be taken as often as time permits with a view to familiarizing the student with the habits and general ecological relations of some of the animals studied. Students wishing further work in invertebrate zoology beyond that offered in this course may continue their study in Zoology 17 offered during the academic year. Laboratory fee, \$3.00.

[S 27. **Embryology of Vertebrates.** Mornings; hours to be arranged. *Histology Laboratory, Stimson Hall.*] Not given in 1925.

S 28. **Human Physiology.** The functions of the human body. Credit four hours. A knowledge of general biology is desirable. Lectures, daily except Sat., 10. Experimental work, M T Th F, 2-5. *Stimson.* Dr. DYE.

The functions of the animal body will be studied systematically in the lectures and illustrated by diagrams and demonstrations, while in the laboratory the student will be required to carry out selected experiments on which the fundamental principles of the science are based. The laboratories in Stimson Hall are equipped with the most recent recording physiological apparatus, all of which the student will have the opportunity of using under direction. Laboratory fee, \$6.

S 30. **General Entomology.** Credit three hours. Equivalent to Entomology 3. Prerequisite Biology I or Zoology I or its equivalent. Lectures, M T W Th F, 10. Practical exercises, M W F, 2-5; S, 8-11. *Roberts* 392. Professor MATHESON.

This course includes lectures and demonstrations on the characteristics of the orders and families of insects, with a study of their habits, life-histories, and relations to other animals and to plants. The laboratory work consists of the study of the structure, ecology, metamorphosis, and classification of insects. Field trips to study insects in their natural habitats are an important feature. Each student is required to collect and prepare a typical collection of insects. Opportunities are given for the rearing of insects in our Insectary, and special work is offered to suit the needs of individual students. Textbook: Comstock's *Manual for the Study of Insects*. Equipment: a good hand lens, several insect cases, insect pins, and labels. These can all be purchased at Ithaca. Laboratory fee, \$2.50.

S 31. **Elementary Morphology of Insects.** Credit three hours. Equivalent to Entomology 4. Twenty-two actual hours a week, by appointment. *Roberts* 391. Mr. MOSSOP.

This course deals with the external and internal anatomy of several representative insects as the locust, roach, cicada, honeybee, crane-fly, etc. Laboratory fee, \$2.00.

S 32. **Elementary Systematic Entomology.** Credit two hours. Equivalent to Entomology 5. Prerequisite course 4. (S 31). Fifteen actual hours a week, by appointment. *Roberts* 391. Professor BRADLEY.

The principles of wing venation and the classification of the orders and families. Laboratory fee, \$2.00.

Courses S 31 and S 32 are required of all students who plan to take advanced work in Entomology.

33a. **Entomology.** Credit two hours. Field and laboratory work, M T W Th, 2-5, and additional hours by appointment. *Roberts* 301. Professor BRADLEY.

The methods of collecting and preserving insects; a systematic exploration of various types of environment. Matters of museum technique. Two all-day field trips will be required. Laboratory fee, \$3.00. Other expenses are the cost of transportation in connection with the excursions, and the cost of equipment and supplies.

33b. **Advanced Systematic Entomology.** Primarily for students who are taking Course 33a. Credit one or more hours, by appointment. *Roberts* 301. Professor BRADLEY.

The identification of genera and species, using as laboratory material the specimens collected in Course 33a.

33c. **Field Entomology.** Provided three or more students so desire, a field excursion will be conducted by Professor BRADLEY in the pine barren region of southern New Jersey between June 22 and June 30. One hour credit will be given.

This region is selected because typical of the austral life zone, affording an environment and groups of insects totally distinct from any around Ithaca. Expenses will be the cost of hotel accommodations and transportation.

Students desiring to take this work must arrange with Professor BRADLEY prior to June 1st.

[S 34. **Advanced Morphology of Insects.** Credit two hours. Equivalent to the first term of Entomology 20. Prerequisite course S 31, and either S 30 or S 32. Lectures, assigned reading, and reports. Daily except Sat., 9. *Roberts* 392.] Not given in 1925.

[S 35. **General Limnology.** Credit three hours. Open to students who have taken courses in general biology or in botany and zoology. Lectures M T W. 8. *Roberts* 392. Laboratory, M T W, 2-4:30, and one period by appointment, *Roberts* 302.] Not given in 1925.

S 39. **Special Problems with Animals.** Credit two hours or more. Hours to be arranged.

Students who are sufficiently prepared may arrange to engage in the special study of some problem or special topic. Such work may lie in the fields of general zoology, ornithology, histology, embryology, human physiology, general entomology, systematic entomology, economic entomology, limnology, or general biology. A member of the staff must supervise the work.

GENERAL COURSES DEALING WITH BOTH PLANTS AND ANIMALS

S 40. **Genetics.** Credit four hours. Prerequisite elementary botany and plant physiology, or elementary zoology and animal physiology, and permission to register. Courses in cytology and in taxonomic botany and zoology will be found helpful. Lectures, M T W Th F, 8. Laboratory, M W F, 2-4:30. Conferences to be arranged. *Fernow*. Assistant Professor FRASER.

A general introductory course designed to acquaint the student with the fundamental principles of heredity and variation. Special attention is given to the Mendelian interpretations of the facts of inheritance. Among the topics to be discussed are: the physical basis of heredity; simple cases of Mendelian inheritance; factor interaction; the determination of sex; factor linkage; measurement of variation; quantitative inheritance; pure lines; inbreeding and cross-breeding; cytoplasmic inheritance; and mutation, with suggestions as to the relation of genetical principles to eugenics. Laboratory studies of variation and of the laws of heredity as illustrated by hybrid material in plants and by breeding experiments with the fruit fly, *Drosophila*. Laboratory fee, \$3.

[S 41. **Cytology.** Credit four hours. Prerequisite course S 1 (Botany 1) or S 20 (Zoology 1) and permission to register. Laboratory, M T W Th F, 9-12:30. A conference hour will be arranged during these periods.] Not given in 1925.

S 42. **General Bacteriology.** Credit four hours. Prerequisite some work in microscopy. Lectures, T W Th F, 9. Laboratory, T W Th F, 10-1. *Veterinary College*. Professor HAGAN.

A general introductory course in bacteriology covering the distribution, morphology, biology, and methods of study of micro-organisms. The latter half of this course is concerned with the bacteriology of water, sewage, milk and milk products, the fermentation industries, and of some of the more important human and animal diseases. The laboratory work is closely correlated with the subject matter of the lectures. After a number of sessions devoted to the development of technique, there follows work on the bacteria of air, water, milk, fermentation processes, and of disease. Laboratory fee, \$10.

METHODS

Arrangements can be made, contingent upon the time of the instructor, for additional instruction in biological technique. This may include instruction in methods of collecting and preparing laboratory and museum material, the technique of hybridization, etc.

RESEARCH

In addition to the various professors named as directly connected with the Summer School of Biology, other professors who may be in residence during the summer will supervise graduate students engaged in research: Professors BLODGETT, BURKHOLDER, MASSEY, REDDICK, and THOMAS in Plant Pathology; Professor HERRICK in Entomology; Professor ALLEN in Ornithology; and Professors EMERSON, LOVE, and MYERS in Plant Breeding and Genetics.

OTHER COURSES

Besides the courses here included in the Summer School of Biology, several other courses dealing with plants and animals are given in the summer and may be found described elsewhere in this pamphlet.

SUMMER SCHOOL OF AGRICULTURE

IN THE NEW YORK STATE COLLEGE OF AGRICULTURE

OFFICERS

LIVINGSTON FARRAND, A.M., M.D., L.H.D., LL.D., President of the University.
ALBERT RUSSELL MANN, B.S.A., A.M., Dean of the College of Agriculture,
Director of the Experiment Station, and Director of Extension. Abroad as
representative of the International Education Board.

CORNELIUS BETTEN, Ph.D., D.Sc., Director of Resident Instruction and Acting
Dean.

GEORGE ALAN WORKS, Ph.B., M.S.A., Professor of Rural Education, Director of
the Summer School.

ROBERT PELTON SIBLEY, M.A., L.H.D., Professor and Secretary.

Staff of Instruction

ARTHUR AUGUSTUS ALLEN, A.M., Ph.D.....Ornithology
(Assistant Professor of Ornithology)

CHARLES LORING ALLEN, Ph.D.....Animal Husbandry
(Assistant Professor of Animal Husbandry)

ELSA GUERDRUM ALLEN, A.B.....Ornithology
(Instructor in Ornithology)

HARRY ELMER BARNES, Ph.D.....Sociology
(Professor of Historical Sociology, Smith and Amherst Colleges)

THOMAS LEVINGSTON BAYNE, jr., M.S.....Rural Education
(Instructor in Rural Education)

CHARLES O. BEAMAN, B.S.....Nature Study
(Teacher of Natural Science, Brockport Normal School)

FREDERICK GARDNER BEHREND, B.S.....Rural Engineering
(Extension Professor of Rural Engineering)

CORA E. BINZEL, B.S.....Rural Education
(Professor of Rural Education)

JAMES CHESTER BRADLEY, Ph.D.....Entomology
(Professor of Entomology and Curator of Invertebrate Zoology)

JULIAN EDWARD BUTTERWORTH, Ph.D.....Rural Education
(Professor of Rural Education)

ELVA CAMPBELL, B.S.....Home Economics
(Instructor in Home Economics)

ANNA BOTSFORD COMSTOCK, B.S.....Nature Study
(Emeritus Professor of Nature Study)

RAYMOND BRIDGMAN COWLES, B.A.....Biology
(Instructor in Biology)

AGNES HOUSTON CRAIG, B.S., M.A.....Rural Education
(Supervisor of Home Economics, Springfield, Massachusetts)

RALPH WRIGHT CURTIS, M.S.A.....Floriculture and Ornamental Horticulture
(Professor of Ornamental Horticulture)

MARY EVA DUTHIE, B.S.....Rural Social Organization
(Instructor in Rural Social Organization)

EVELYN EASTMAN.....Home Economics
(Assistant, Wayne County, Michigan, Psychopathic Clinic)

THEODORE HILDRETH EATON, Ph.D.....Rural Education
(Professor of Rural Education)

HARRIET EDGEWORTH, Ph.D.....Home Economics

GEORGE CHARLES EMBODY, Ph.D.	Entomology
(Professor of Aquiculture)	
RALPH ALMOND FELTON, M.A.	Rural Social Organization
(Extension Professor of Rural Social Organization)	
EMERY N. FERRISS, Ph.D.	Rural Education
(Professor of Rural Education)	
CLARENCE TRUMAN GRAY, Ph.D.	Rural Education
(Associate Professor of Education, University of Texas)	
IVAN C. HALL, Ph.D.	Dairy Industry
(Professor of Bacteriology)	
CHRISTINE HEINIG.	Home Economics
(Kindergartener)	
OLIVE M. HOEFLE.	Nature Study
(Assistant in Nature Study)	
M. L. HOLMES, M.B.A.	Business Management
(Professor of Marketing)	
EDWIN RAY HOSKINS, B.S.	Rural Education
(Instructor in Rural Education)	
RALPH SHELDON HOSMER, B.S.A., M.F.	Forestry
(Professor of Forestry)	
HOYT HOPEWELL HUDSON, Ph.D.	Rural Social Organization
(Assistant Professor of English and Public Speaking, Swarthmore College)	
LEE SISSON HULTZEN.	Public Speaking
(Assistant Professor of Public Speaking)	
CHARLES EDWARD HUNN.	Floriculture and Ornamental Horticulture
(Instructor in Ornamental Horticulture)	
DELIA E. KIBBE, A.M.	Rural Education
(Elementary Supervisor, State of Wisconsin)	
PAUL J. KRUSE, Ph.D.	Rural Education
(Professor of Rural Education)	
O. H. LARSEN.	Agricultural Economics and Farm Management
(Department of Agricultural Economics, Royal Agricultural College, Copenhagen, Head of Bureau of Agricultural Economics)	
FRANK W. LATHROP, Ph.D.	Rural Education
(Assistant Professor of Agricultural Education, University of Minnesota)	
ROBERT MATHESON, Ph.D.	Entomology
(Assistant Professor of Economic Entomology)	
LUA ALICE MINNS, M.S.	Floriculture and Ornamental Horticulture
(Instructor in Floriculture)	
CLYDE B. MOORE.	Rural Education
(Professor of Education, University of Pittsburgh)	
MERVYN CHARLES MOSSOP.	Entomology
(Assistant in Entomology)	
WALTER CONRAD MUENSCHER, Ph.D.	Botany
(Assistant Professor of Botany)	
WILLIAM IRVING MYERS, Ph.D.	Agricultural Economics and Farm Management
(Professor of Farm Finance)	
MILTON G. NELSON, B.S.	Rural Education
E. LAURENCE PALMER, Ph.D.	Rural Education
(Professor of Rural Education)	
GEORGE ERIC PEABODY, B.S.	Extension Teaching
(Instructor in Extension Teaching)	
FRANK ASHMORE PEARSON, Ph.D.	Agricultural Economics and Farm Management
(Professor of Marketing)	

NELLIE PERKINS, Ph.D.	Home Economics (Director Wayne County, Michigan, Psychopathic Clinic)
MILES D. PIRNIE, B.S.	Ornithology (Instructor in Ornithology)
JOSEPH PULLMAN PORTER, M.S.A., M.L.D.	Floriculture and Horticulture (Assistant Extension Professor of Ornamental Horticulture)
DOROTHY RICHARDSON, A.B.	Biology (Assistant in Biology)
LOUIS MICHAEL ROEHL, B.S.	Rural Engineering (Assistant Professor of Rural Engineering)
EZRA DWIGHT SANDERSON, Ph.D.	Rural Social Organization (Professor of Rural Social Organization)
HENRY WILLIAM SCHNECK, M.S.A.	Vegetable Gardening (Assistant Professor of Vegetable Gardening)
LELAND SPENCER, Ph.D.	Agricultural Economics and Farm Management (Assistant Professor of Marketing)
WILLIAM L. SPENCER, B.A., M.A.	Rural Education (High School Inspector, State Department, Alabama)
ROLLAND MACLAREN STEWART, Ph.D.	Rural Education (Professor of Rural Education)
GEORGE FREDERICK WARREN, Ph.D.	Agricultural Economics and Farm Management (Professor of Farm Management)
MILFORD MURRY WILSON, M.D.	Meteorology (Professor of Meteorology)
GEORGE ALAN WORKS, Ph.B., M.S.A.	Rural Education (Professor of Rural Education)

COURSES IN THE COLLEGE OF AGRICULTURE

The New York State College of Agriculture provides courses of instruction under the rules and regulations that follow:

1. **Admission.** The Summer School in the College of Agriculture is designed to meet the needs of persons engaged in educational work, including teachers, supervisors, superintendents, extension workers, and others.

2. **Tuition and Fees.** Tuition in any of the courses following is free to admitted students who are residents of New York and who have been residents for at least one year immediately preceding registration. An incidental fee of ten dollars is, however, charged to all students. Students from outside of the State of New York, whether they take one subject or more, will pay \$50, in which is included the incidental fee. For the time and place of payment see page 13.

In certain courses laboratory fees are charged. These are indicated in connection with the courses. Fee cards must be procured from the instructor at the first exercise, and must be returned to him receipted within five days.

3. **Academic Credit for Work.** A student who has previously satisfied the entrance requirements of the College may obtain credit for work in a Summer School up to a limit of eight hours. Residence credit will be given if six hours are passed, but not more than a total of two terms of residence may be obtained by attendance at Summer Schools.

The demand for some courses is not great enough to justify offering them every year. For this reason certain departments of the college offer instruction only in alternate years. For the requirements of the degree B.S. (eight terms, 120 hours, etc.) see the Announcement of the College of Agriculture.

Summer Term. The Summer Term of twelve weeks formerly conducted in this college has been discontinued and additional courses are now offered in the Summer School of Agriculture.

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

S 2. Farm Management. Credit three hours. Lectures, daily except Sat., 11. Laboratory, T, 2-4:30; S, all day. *Farm Management 102.* Professor WARREN.

This course is designed for advanced and graduate students. Undergraduates must receive permission to register. It should be preceded by economics and as many as possible of the courses dealing with the production of crops and animals.

Lectures, recitations, and laboratory practice. Farming as a business; types of farming; balance of business; size of business; rates of production; farm layout; building arrangement; labor management; machinery; marketing; ways of beginning a farm; forms of tenure and leases; choosing and buying a farm; use of capital and credit; planning, organization, and management of specific farms. Field trips on Saturday beginning at 8 a. m. One of the trips will require two days. Laboratory fee, \$2.00.

S 15. Agricultural Statistics. Credit two hours. Lectures, T Th, 8. *Farm Management 102.* Laboratory, M W, 2-4:30. Professor PEARSON.

A study of the principles involved in the collection, tabulation, and interpretation of agricultural statistics. This course is designed for students who expect to do research. Laboratory fee, \$3.

S 25. Business Management of Cooperative Associations. Credit one hour. Lectures, M W F, 10. *Farm Management 102.* Professor MYERS.

A study of the principles involved in the successful operation of cooperative business organizations. Special attention will be given to problems of finance and business organization.

S 26. Agricultural Cooperation in Denmark. Credit one hour. Lectures, T Th, 12. *Farm Management 102.* Professor O. H. LARSEN.

S 30. Methods and Results of Research in Marketing. Credit two hours. Lectures, daily except Sat., 9. Laboratory, F, 2-4:30. *Farm Management 102.* Assistant Professor SPENCER.

This course is designed to acquaint the student with methods of research in marketing problems, sources of data, and results of marketing studies. The factors which enter into efficient marketing will be considered. Methods of measuring these efficiency factors and results of such studies applied to some nationally grown products will be given.

S 40. Business Management. Credit two hours. Lectures, daily except Sat., 11. *Marketing.* Professor HOLMES.

A study of some of the principles of business administration, illustrated by representative problems from various types of business. Problems of production, purchasing, selling, financing, and general administration will be considered. Some attention will be given to methods of research in the collection of data and in problems from business firms.

S 50. Agricultural Prices. Credit two hours. Lectures, M W, 8. Laboratory, Th, 2-4:30. *Farm Management 102.* Professor PEARSON.

S 51. Advanced Prices. Credit one hour. Lecture, F, 8. Laboratory by assignment. *Farm Management 102.* Professor PEARSON.

S 60. Public Problems of Agriculture. Credit one or two hours. Lectures, M W F, 12. *Roberts* 131. Discussion period, M W F, 4:30. *Farm Management* 102. Credit one hour for those who take the 12 o'clock lectures only. The discussion periods are primarily for graduate students and are more technical. Credit two hours for those who take both periods. Professor MYERS in charge.

A series of lectures intended to give a brief survey of some of the outstanding economic, social and educational problems of agriculture. Among the speakers will be agricultural leaders of national prominence.

ANIMAL HUSBANDRY

S 1. The General Principles of Animal Nutrition and Practice in Computing Rations. Credit two hours. Daily except Sat., 9. *Animal Husbandry* B. Assistant Professor ALLEN.

S 2. Types and Breeds of Farm Animals. Credit two hours. Daily except Sat., 11. *Animal Husbandry* B. Assistant Professor ALLEN.

The origin, history, and development of breeds, together with practice in scoring and judging.

AQUICULTURE

S 51. Aquiculture. Credit three hours. Lectures, T W Th, 9. *Roberts* 392. Laboratory and field work, T Th, 2-5. *Experimental Hatching Station*. Professor EMBODY.

The lectures will treat the methods used in governmental and private commercial hatcheries for propagating useful aquatic organisms, more especially the food, game, and ornamental fishes.

The laboratory and field work is designed to give acquaintance with certain aquatic organisms involved in the propagation of fishes, their environmental requirements, and the cultural procedure. Laboratory fee, \$2.00.

BIOLOGY

S 1. General Biology. Credit one or three or four hours. (a) For three hours' credit, lectures and recitations, daily except Sat., 11. *Roberts* 392; laboratory and field work, M W F, 2-4:30; other sections by special appointment, *Roberts* 302. (b) For one hour credit, conferences and laboratory, T Th, 2-4:30. These two periods (a) and (b) must also be taken by those wishing four hours' credit. Mr. COWLES and Miss RICHARDSON.

BACTERIOLOGY

S 1. General Bacteriology. Credit two or four hours. Lectures, M T W Th F, 2. Laboratory, M T W Th F, 3-5. *Dairy* 119. Professor HALL.

An introductory course giving a general survey of the field of bacteriology together with the fundamentals essential to further work in the subject. Laboratory fee, \$10.00, part returnable.

BOTANY

S 5. Trees and Shrubs. Credit two hours. Lectures, Th, 2. Laboratory or field work, T, 2-5, Th, 3-5, also M W, 2-5 if sufficient students register. *Stone*. Assistant Professor MUENSCHER.

A course intended for those who wish to know the woody plants in the field. The aim is to familiarize the student with as many as possible of the trees and shrubs of the Cayuga Lake flora and to teach the main facts of structure, growth, habit, and distribution concerning them. Some all-day trips will be required. Laboratory fee, \$1.50; deposit, \$3.00.

Other courses in the biological sciences are offered in the Summer School of Biology; see p. 47.

ENTOMOLOGY

S 3. General Entomology. Credit three hours. Identical with S 30 in Summer School of Biology. Prerequisite Biology 1, or Zoology 1 or its equivalent. Lectures, M T W Th F, 10. Practical exercises, M W F, 2-4:30. *Roberts* 392. Professor MATHESON.

This course embraces lectures and demonstrations on the characteristics of the orders and families of insects: their habits, life-histories, and relations to other animals and to plants; methods of rearing, studying, collecting, and mounting insects.

The laboratory work will consist in the study of the structure, ecology, metamorphoses, and classification of insects. Field trips to study insects in their natural habitats will be an important feature. Each student will be required to collect and prepare a typical collection of insects. Opportunity will be given for the rearing of insects in our Insectary and special work to suit the needs of students will be offered. Textbook, Comstock's *Manual for the Study of Insects*. Equipment: A good hand lens, several insect cases, insect pins, and labels. These can all be purchased at Ithaca. Laboratory fee, \$2.50.

S 4. Elementary Morphology of Insects. Credit three hours. Identical with S 31 in the Summer School of Biology. The work is individual; twenty-two actual hours a week in the laboratory at times to be arranged. In this course the external anatomy of a number of insects (locust, bee, cicada, ground beetle, etc.) is studied as well as the internal anatomy of some large representative species. *Roberts 391*. Mr. Mossop. Laboratory fee, \$2.

S 5. Elementary Systematic Entomology. Credit two hours. Identical with S 32 in the Summer School of Biology. The work is individual; fifteen actual hours a week at times to be arranged. Prerequisite Course 4. The aim of this course is to acquaint students with the external structure of insects for the purpose of identification of the commoner families. *Roberts 391*. Professor BRADLEY. Laboratory fee, \$2.

Courses 4 and 5 are required of all students who plan to take advanced work in entomology.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

S 1. Garden Flowers. Credit one hour. Lectures, M F, 11. Laboratory, M, 2-5. *Greenhouses*. Miss MINNS.

This is designed as an elementary course of value in home flower garden or school garden work. It is outlined so as to acquaint students with the most valuable material for this work, and to cover, as time may permit, methods of propagation and culture. Laboratory fee, \$1.50.

S 2. Indoor Flower Growing. Credit one hour. Lectures, T Th, 11. Laboratory, T, 2-5. *Greenhouses*. Miss MINNS.

The propagation and culture of plants suitable for winter gardens in school-rooms, including a study of containers, soils, fertilizers, insecticides. The selection of varieties of bulbs and their methods of culture indoors are considered, as are also the method of propagation and general care of species of plants suited for indoor culture.

S 3. Landscape Planning. Credit two hours. Lectures, W, 9, Th, 12, F, 8-10. Practice, Sat., 10:30-1. Should be accompanied by S 6. Registration limited to 16. *Caldwell 400*. Assistant Professor PORTER. Not a professional course.

A discussion of the fundamental principles involved in landscape planning as related to the home grounds, school grounds, and village improvement work. A brief course intended for students who desire an intelligent point of view but who do not intend to take technical courses. Laboratory fee, \$1.00.

S 4. Garden Flowers. Credit two hours. Lectures, M T Th, 9. Laboratory, W F, 2-5. *Greenhouses and Gardens*. Miss MINNS. Laboratory fee, \$2.00.

This course, planned primarily for graduate and advanced students in floriculture and ornamental horticulture, comprises a study of herbaceous plant materials. The aim is to give the student such an intimate knowledge of these forms of plants as may be used in garden planting, either on home grounds, rural social centers, or public parks, more particularly with reference to summer conditions. Students must have had sufficient botany to be familiar with the botanical characters and classification. An excellent collection of plant material is available for demonstrations. All members of the class will participate in an excursion to the Thompson Estate at Canandaigua on August 13.

S 5. Woody Plant Materials for Landscape Planting. Credit three hours. Lectures, M T W Th, 8. Laboratory and field trip, M T W, 10-12:30; Th, 10-12; M T, 2-4:30. *Greenhouses and Campus.* Professor CURTIS and Assistant Professor PORTER. Intended for graduate students and advanced students in floriculture and ornamental horticulture. Laboratory fee, \$2.

A study of the characteristics and requirements of trees, shrubs, and vines, for landscape planting. The laboratories and field trips enable the student to recognize common woody plants. The lectures discuss planting areas and planting practices, and plant materials, in order that the student may learn to see plants not only as growing things but as possible units in planting in design with which he may be able to improve his surroundings. All members of the class must participate in an excursion to Rochester and Buffalo on August 14 and 15 to visit private estates and public parks.

S 6. Landscape Planting. Credit one hour. Lectures, Th, 10. Practice, Th, 2-5. W, 10-1. Should be accompanied by S 3. *Caldwell 400. Greenhouses and Campus.* Assistant Professor PORTER.

A brief course intended to familiarize the student with the best trees, shrubs, and vines for landscape work. Names, characteristics, and requirements will be studied in the field and the laboratory. Lectures will deal with planting practices and the selection and arrangement of plants. Laboratory fee, \$1.50.

S 7. Woody Plant Propagation and Nursery Work. Credit one hour. Lectures, F, 10. Laboratory, S, 8-10:30, Th, 2-5. Laboratory fee, \$3. Mr. HUNN.

This course considers the methods of propagation of all classes of ornamental woody plants and their special treatment during the first stages of growth. It also acquaints the students with the principles governing the transplanting of trees, shrubs, and herbaceous perennials and the methods practiced in all types of commercial nursery management. Must be accompanied by S 3, S 4, and S 5. *Floriculture Building and Nursery.*

FORESTRY

S 1. Forest Trees. Credit one hour. T Th, 8. Field work, W, 2-4:30. *Fernow 122.* Professor HOSMER.

This course lays emphasis on simple means of identification of the principal forest trees of this region. It includes a study of the characteristics of forest trees which may be observed at various seasons of the year. Some attention will be given to the identification and the commercial uses of a few of the principal kinds of woods. Field work supplements the work in the lecture room. This course should be helpful to teachers in connection with their work in nature study and biology.

S 2. Forests and Forestry. Credit two hours. Lectures, M T W F, 9. Field work, Th, 2-4:30. *Fernow 122.* Professor HOSMER.

This course will carry forward the foundation work of Forestry S 1. It presupposes a working knowledge of the native trees. The two courses, while independent, are supplementary to each other. Forestry S 1 is not a prerequisite.

Topics to be considered: the nature and scope of forestry; methods employed in the perpetuation of forests; the economic importance of forests to the nation, including influence on stream flow and the relation of the forest to recreation, with special application to New York State; brief description of the forest regions of the United States; present status of Federal, State, and private forestry. The lectures will embody suggestions as to the use by teachers of certain of the subject matter in their school courses in geography.

As far as is possible, the lectures are followed by opportunities to make special observations in the field.

HOME ECONOMICS

S 25. Child Feeding. Credit two hours. Prerequisite a sound technical knowledge of dietetics. Lecture and discussion, daily except Sat., 2. *Home Economics 100.* Miss EDGEWORTH.

This course is designed to meet the needs of persons having thorough technical training in nutrition who desire more fundamental knowledge of nutrition through an intensive study of the problems of child feeding. It will include a study of the physical development and feeding of children during the period of infancy as well as pre-school and school years. The best ways and means of securing better food practices among children and the relationship these habits bear to healthy adulthood will be considered. Most benefit will result from close correlation of this course with that in child training. Students registered for this course are therefore advised to register also for S 215. Fee for mimeographed material, \$.50.

S 25a. Practice in Child Feeding. Credit two hours. Prerequisite a sound technical knowledge of dietetics and food preparation. Must be taken parallel with S 25 and S 215a. Practice twice weekly, 9-1. To alternate with S 215a. *Nursery School Kitchen.* Miss EDGEWORTH and Miss CAMPBELL.

The laboratory practice will consist of the study of the problem of feeding a group of pre-school children and will include the opportunity to plan, prepare, direct, and observe the midmorning and noon lunches of this group and consultations with parents on family feeding problems. Registration limited to twenty students. Laboratory fee, \$5.

S 25b. Practice in Child Feeding. With S 215b credit one hour. Prerequisite a sound technical knowledge of dietetics and food preparation. To be taken parallel with S 25 and S 215b. Practice, F, 9-11, alternating with S 215b. *Nursery School Kitchen.* Miss EDGEWORTH and Miss CAMPBELL.

The laboratory practice will consist of a briefer study of the same problems as those taken up in S 25a. Registration limited to twenty students. Laboratory fee, \$2.50.

S 30. Advanced Nutrition. Credit two hours. Prerequisite a sound technical knowledge of dietetics. Lecture and discussion, T Th, 3-5. *Home Economics* 100. Miss EDGEWORTH.

This course is designed to meet the needs of those who desire an intensive study of problems of human nutrition. Fee for mimeographed material, \$.50.

S 215. Child Training. Credit two hours. Prerequisite psychology. Conference with instructor required for admission. Lectures, daily except Sat., 8. *Home Economics* 100. Dr. NELLIE PERKINS and Miss EASTMAN.

This course is designed primarily for persons interested in teaching home economics who feel the need for a greater knowledge of the problems of child training. The lectures and conferences will include study of the behavior problems of pre-school children and ways of meeting them, and of the relationship which a right solution of these problems at this period bears to efficient and healthy adulthood. Fee for mimeographed material, \$.50.

S 215a. Practice in Child Training. Credit two hours. Prerequisite a thorough knowledge of psychology. Must be taken parallel with S 215 and S 25. Practice, twice weekly 9-1. To alternate with S 25a. *Nursery School.* Dr. NELLIE PERKINS, Miss EASTMAN, and Miss HEINIG.

Practice will include observation of and assistance in the problem of habit training of a group of pre-school children. This course will be closely correlated with the course in child feeding. Registration limited to twenty students. Laboratory fee, \$5.

S 215b. Practice in Child Training. With S 25b credit one hour. Prerequisite a thorough knowledge of psychology. To be taken with S 215 and S 25b. Practice, F, 9-11 alternating with S 25b. *Nursery School.* Dr. NELLIE PERKINS, Miss EASTMAN, and Miss HEINIG.

The laboratory practice will consist of a brief study of the same problems as those taken up in S 215a. Registration limited to twenty students. Laboratory fee, \$2.50.

S 200. Child Care. Credit two hours. Lectures, M W F, 8, or M W F, 3. *Home Economics* 245. Practice by arrangement. *Nursery School.*

This course is designed to give to teachers of home economics some fundamental conception of the characteristics of healthy human bodies and some ability to

detect signs of physical disturbance which should have medical attention. Fee for mimeographed material, \$.50.

S 218. Seminary in Child Training. Credit two hours. Prerequisite S 215 or its equivalent. M W, 3-5. *Home Economics* 100. Dr. NELLIE PERKINS.

A discussion of special problems in child training. Fee for mimeographed material, \$.50.

METEOROLOGY

S 1. Meteorology and Climatology. Credit two hours. Lectures and discussions, daily except Sat., 10. *East Roberts* 222. Professor WILSON.

This course is adapted to the needs of teachers and students of subjects in which weather and climate are important factors, particularly teachers of physical geography and general agriculture. It is designed to acquaint the student with the laws governing the primary and secondary circulation of the atmosphere and with the development, progression, and conditions that attend cyclones, tornadoes, and other atmospheric phenomena. Attention is given to the principles and practice of weather forecasting from weather maps and from local observations.

S 2. Meteorology and Climatology, Laboratory Course. Credit one hour. W F, 2-4:30, or other periods to be arranged. Must be accompanied by Course S 1. *East Roberts* 341. Professor WILSON.

The work consists in the study of the principal weather and climatic elements with the aid of maps, charts, and instruments. The various meteorological instruments will be studied, as well as the methods of taking and recording the observations.

NATURE STUDY

S 1. General Nature Study. Credit two hours. Lectures, M W F, 10. *Fernow* 122. Field and laboratory observations, T Th, 10-12:30 or 2-4:30, *Fernow* 8. Professor PALMER, Professor COMSTOCK, Mr. BEAMAN, and Miss HOEFLE.

To acquaint teachers with the principles and methods of education through nature study and to give them practice which will permit them to carry on the work independently. As many as possible of the laboratory periods will be spent in the fields in the study of birds, trees, plants, and insects, and students expecting to take the course should keep this in mind. The program adopted by the *Cornell Rural School Leaflet* since January 1920 will be followed in lectures and the exercises will include practical methods for conducting nature study in graded and ungraded elementary schools.

S 3. Nature Literature. Credit two hours. Lectures, M W F, 12. Laboratory periods to be arranged. *Fernow* 16. Professor COMSTOCK.

Only those who have had course S 1 or its equivalent are eligible. The course includes discussions of nature study reference books, nature story writers, and nature essayists and poets.

S 63. Science in the Rural Secondary School. Credit two hours. Daily except Sat., 9. *Fernow* 16. Professor PALMER. See Rural Education, course S 63.

ORNITHOLOGY

S 1. Ornithology. Credit three hours. Lectures, M W F, 11. *McGraw* 5. Laboratory, M W, 2-5, or T Th, 2-5. Field work, M W, or T Th, 5:30-8 a. m. Assistant Professor ALLEN, Mrs. ALLEN, and Mr. PIRNIE.

This course gives an introduction to the study of birds and familiarity with the local species. The lectures cover such subjects as classification, migration, coloration, song, nest-building, eggs, care of young, methods of attracting birds, and economic importance. The laboratory work with bird skins gives an intimate knowledge of the birds of Eastern North America and familiarity with the use of a manual. The aim of the field work is the identification of birds by their songs, as well as by their plumage and habits. Each student should be provided with Chapman's *Handbook of Birds of Eastern North America* and with field or opera glasses. Laboratory fee, \$.2.

S 2. Applied Ornithology. Credit two hours. Lectures, laboratory, and field work, T Th, 2-5, and other hours by appointment. *McGraw*. Open only to

those who are taking the elementary course or who have had its equivalent. Assistant Professor ALLEN.

This course is intended to meet the needs of teachers or students who plan further study of ornithology. The lectures cover the field open to prospective ornithologists, methods of teaching, preparation of specimens and lantern slides, bird photography, wild life conservation, and game farming. The laboratory and field work will give practical exercises. Laboratory fee, \$2.

PUBLIC SPEAKING

S 1a. Oral Expression. Credit two hours. Lectures and practice, daily except Sat., 10. *Roberts 131*. Criticism by appointment, daily 8-1. Registration limited to twenty-five students. Open only to upperclassmen and regular summer school students. Mr. PEABODY.

Practice in oral and written presentation of topics in agriculture, with criticism and individual appointments on the technique of public speech. Designed to acquaint students with parliamentary practice, to encourage interest in public affairs, and, through demonstrations and the use of graphic material and other forms, to train for effective self-expression in public.

RURAL EDUCATION

S 2a. Educational Psychology. Credit two hours. Daily except Sat. Section I, 11. *Caldwell 143*. Section II, 9. *Caldwell 143*. Professors GRAY and KRUSE.

The original nature of man: reflexes, instincts, and capacities; individual differences; the nature of learning; progress in learning; transfer of learning; such special phases of learning as habit formation, memorizing, motor learning, and controlled thinking.

S 2b. Educational Psychology. Credit two hours. M W F, 7:30-9 a. m. *Caldwell 250*. Professor KRUSE. Prerequisite S 2a or its equivalent. Students who have not had S 2a should confer with the instructor before registering for this course.

Following the argument of S 2a, more extended treatment will be given to selected topics in the psychology of learning, such as: the laws of learning, transfer of learning, motor learning, progress in learning, controlled thinking.

S 4. Principles of Teaching. Credit two hours. Daily except Sat. Section I, 2. *Caldwell 143*. For students interested in the teaching of high school subjects. Section II, 9. *Caldwell 100*. For students interested in teaching elementary subjects. Mr. SPENCER and Mr. NELSON.

A consideration of the problems of teaching; how to motivate study, cultivate interest, organize teaching materials, plan class work, select and solve problems, construct and present questions, drill, measure the results of teaching, etc., to make clear the principles which are fundamental to efficient instruction.

S 6. The Teaching of Agriculture in the High School. Credit two hours; with laboratory, three hours. Daily except Sat., 9. *Caldwell 282*. Laboratory, T Th, 2-4:30. *Caldwell 282*. Designed for teachers of agricultural courses or for students preparing to teach such courses. Professors LATHROP and STEWART.

A study of the problems confronting the teacher of agriculture; the vocational point of view in instruction; determination of courses of study; making up the agricultural part of the curriculum; forms of teaching, including a consideration of the use of the project and the survey; the selection and utilization of textbooks, materials, and equipment; the organization of materials of instruction in agricultural courses; the relationships of the teacher to other agencies.

S 7. Teaching Home Economics in the Secondary School. Credit four hours. Daily except Sat., 9 and 11. *Home Economics 100*. Professor BINZEL.

This course is particularly concerned with modern methods of education as related to home economics and is designed to assist teachers in improving their methods of teaching. Consideration will be given to problems involved in the determination and construction of home economics curricula designed to meet the needs and interests of elementary and secondary school pupils, both voca-

tional and elective; for part time and continuation schools; analysis of teaching steps in type units of given courses; teaching plans, individual instruction sheets; modern teaching methods; measuring and evaluating the progress of pupils; home projects; coordinating class work with homemakers' interests; coordinating home economics with related art and science.

S 8. Foundations of Method. Credit two hours. Daily except Sat., 12. *GS 120.* Professor MOORE.

This course is designed primarily for experienced elementary and high school teachers and supervisors. It will include a critical examination of current and proposed educational methods in the light of accepted principles of educational psychology. Special attention will be given to the theories involved in project-teaching. The course will include such topics as the laws of learning, interest and effort, the thinking process, the organization of experience, the relationship between subject matter and the educative process, discipline and moral training.

S 10a. Educational Measurement. Credit two hours. Daily except Sat., 8. *Caldwell 282.* For teachers and principals. Mr. BAYNE.

A beginning course in educational measurement. The need, the means, and the general method of measurement in education; typical tests and scales from the point of view of their use by the teacher and the principal; relation of achievement tests and mentality tests; elementary statistical terms and methods; teachers' marks. Text: Lincoln, *Beginnings in Educational Measurement*.

S 10b. Educational Measurement. Credit two hours. Daily except Sat., 10. *Caldwell 282.* For principals, supervisors, superintendents, and other administrative officers. Students in doubt whether to elect S 10a or S 10b are asked to consult the instructor. Mr. BAYNE.

The need and method of measurement in education as related to the work of administrative officers. School achievement tests, mentality tests, teacher's marks, score cards for teachers, etc. Emphasis will be placed upon the statistical treatment of educational data, the collection, tabulation, and classification of data, summarization of data, and their presentation to school patrons or other interested groups in tabular and graphic form.

S 13. History of American Education. Credit two hours. Daily except Sat., 10. *Caldwell 143.* Professor MOORE.

The origin and development of American educational movements and institutions. A very brief consideration of the European educational background and its relation to early American education. Special emphasis is given to the development of public education as shown in the various state systems of public instruction and the social, religious, economic, and political factors influencing its organization, administration, and function. Various types of educational institutions will be studied as to purposes, methods, curriculum, support, ideals, and the like.

S 14. The Training of Teachers of Agriculture. Credit two hours. Daily except Sat., 8. *Caldwell 492.* Professor EATON.

A course based upon the study of the work of teachers of agricultural vocations in the secondary schools. In the light of such study will be discussed the demands upon the teacher; current and ideal standards of qualification in teachers; the aims, admission requirements, course-content, methods, and administrative organization of institutions for the training of teachers of agriculture.

S 15. Problems of Training Teachers of Home Economics. Credit two hours. Daily except Sat., 10. *Caldwell 250.* Miss CRAIG.

Designed to meet the needs of persons who have had both technical preparation in home economics and experience in teaching, and who desire to prepare for the special problems involved in the professional work of preparing teachers of home economics. The course treats collegiate and secondary curricula in home economics with reference to the technical preparation of teachers, their professional needs, supervised teaching experience, and the organization and content of the special methods courses in home economics. Consideration is also given to the subject matter of home economics and to correlations with other subject matter.

S 16. The High School in Rural and Village Communities. Credit two hours. Daily except Sat., 11. *Caldwell 282.* Professor FERRISS.

A course dealing with basic problems of modern secondary education in its adaptation to rural and village conditions. Special consideration is given to the junior high school as a practicable form of secondary school organization for the rural or village community and to curriculum organization and content. Other guiding topics are: the scope and functions of secondary education; present demands upon the rural and village high school; the senior high school in rural and village communities; prevocational and vocational work; educational and vocational guidance; extra-classroom activities; needed forms of extension work.

S 17. The Rural and Village Principalship. Credit two hours. Daily except Sat., 8. *Caldwell 143.* Professor FERRISS.

A course designed for principals and superintendents of rural and village schools having both the elementary and the high school work, and for those preparing for such positions. It deals with such practical problems as the preliminary organization of the school; schedule making and distribution of teaching load; aims and methods of supervision; teachers' meetings; the training of teachers in service; measuring teachers' efficiency; testing, grading, and promotion of pupils; school government; direction and control of extra-classroom activities; guidance of pupils; supervision of studies; the principal and the community.

S 18. Principles of Rural School Administration. Credit two hours. T Th S, 7:30-9 a. m. *Caldwell 250.* Professor BUTTERWORTH.

A consideration of problems in administration for the attainment of these objectives: (1) an understanding of significant questions that face the rural school administrator; (2) a comprehensive view of the organization of education in the state, particularly with reference to the rural situation; (3) the development of principles for the guidance of the administrator in attacking his problems. The approach will be through an analysis of specific administrative difficulties.

S 19. Special Problems in Rural School Administration. Unit B. School Finance. Credit two hours. Daily except Sat., 10. *Caldwell 250.* Professor BUTTERWORTH.

This is the second unit in a four-year cycle dealing intensively with problems of rural school administration. Other units will be given in subsequent summers.

A study of sources of school funds; relation of school revenues to wealth; types of equalization funds; methods of distributing such funds; cost accounting; budget making; and the organization of school taxation. These problems will be considered with reference particularly to the needs of village principals, and county and district superintendents.

S 20. Administration and Supervision of Vocational Agriculture. Credit two or three hours. Daily except Sat., 9. *Caldwell 294.* Professor WORKS.

This course is designed for persons engaged in the supervision of vocational agriculture or those planning to enter such work. It deals with the administration and supervision of agricultural education under the Vocational Education Act; State legislation; related Federal legislation; curricula. Opportunity will be given for visits to schools in New York and adjacent states.

S 21. Supervision and Administration of Home Economics. Credit two hours. Daily except Sat., 2. *Caldwell 294.* Miss CRAIG.

Intended for supervisors and for experienced teachers who are preparing for supervisory positions in home economics. The course is concerned with the analysis of the supervisor's work and with methods of supervision. Among the problems presented for study and investigation will be the organization and the administration of homemaking departments; departmental budgets; reports; equipment and building plans; principles underlying present-day changes in home economics education; principles underlying the organization of courses; evaluation of teaching; improvement of teachers in service; teachers' conferences and study classes.

S 29. Rural Elementary Curriculum. Credit two hours. Daily except Sat., 9. *Caldwell 250.* Miss KIBBE.

What is the function of elementary education? How is the curriculum related to the accomplishment of this major purpose? What factors should be considered in making a curriculum for the rural elementary school? How should it be related to rural life, to agriculture? How should it be organized to fit the ungraded school? Should it differ at all from the curriculum for city schools? How should the contents of the curriculum be organized to promote most effective learning? In what respects is the teacher responsible? How do the answers affect the several school subjects?

Intended not only for those who are to work specifically in this field, but also for any whose work is related to it, such as nature study specialists, junior project leaders, and principals of elementary schools.

S 32. Psychology of Reading. Credit two hours. Daily except Sat., 11. *Caldwell 100.* Professor GRAY.

This course deals with the different phases of the reading process as they have been developed by experiment. Among the topics to be considered are perception as it relates to reading; the motor phases of reading; the higher mental activities as involved in reading, etc. Attention will be given to diagnosis and remedial work, and some of the principles which underlie intermediate and upper grade work. Intended for teachers of reading, principals, supervisors, and superintendents.

S 33. Technique of Rural School Supervision. Credit two hours. Daily except Sat., 3. *Roberts 292.* Miss KIBBE.

This course is devoted to a practical consideration of the district superintendent's problems in supervising rural schools. The topics considered will be adjusted to the interests and problems of the group; the function of the supervisor in promoting efficient teaching; standards for judging the many phases of school work, such as the selection of subject matter, the use of textbooks, the assignment, the conduct of the recitation. Available means of supervisory leadership are suggested for consideration. The experiences of the class, procedure and practice in other states, and the suggestions from principles of education will be utilized to develop practical plans of supervision.

S 35. The Junior High School and the Rural Community. Credit two hours. Daily except Sat., 9. *Roberts 292.* Mr. SPENCER.

A survey of the development of the junior high school with particular reference to its function in rural communities. Discussion falls under such headings as: causes contributory to the development of the junior high school, its place in the reorganization of public education; its aims and essential features; types of administrative organization; types of curricular organization; demands for adaptation in teaching-methods; the teaching force; buildings and equipment; provision for activities outside the classroom; and other school problems incident to the establishment and operation of a junior high school in the small town or open country.

S 39. The Teaching of Agriculture in the Elementary School. Credit two hours. Daily except Sat., 11. *Caldwell 282.* Professor LATHROP.

Designed for teachers, junior extension workers, supervisors, and others interested in the selection of specific subject matter, teaching situations and the principles involved in elementary agriculture. It includes consideration of aims, what should be taught, the sources of subject matter and its organization, teaching materials, methods and devices for teaching. Special consideration will be given to boys' and girls' club work, particularly in its relation to school instruction.

S 45. The Theory of Vocational Education. Credit two hours. Daily except Sat., 10. *Caldwell 492.* Professor EATON.

Open to graduate students in Rural Education or in Education, and to other students upon approval by the instructor.

This course consists in discussions of questions developing the social, economic, and psychological implications of a publicly maintained system of vocational education.

S 49. Principles of Education. Credit two hours. Daily except Sat., 10. *Caldwell 100.* Designed for advanced students. Professor STEWART.

The meaning of education, considered in the light of psychological and sociological foundations; the principles underlying the conduct of the school

S 63. Science in the Rural Secondary Schools. Credit two hours. Daily except Sat., 9. *Fernow 16.* Professor PALMER.

A study of the science program in rural high schools; the functions of the recognized high school sciences such as general science, biology, zoology, physics, chemistry, and physical geography, together with methods of teaching. Designed primarily for experienced teachers. Teachers will find it useful in connection with this course to take in addition at least one hour's work in General Biology S 1, where problems in laboratory practice and technique will be presented.

RURAL ENGINEERING

S 11. Farm Mechanics. Credit one or two hours. Lectures, T Th F, 8. *Marketing.* Laboratory, T Th, 2-4:30. *Farm Mechanics Laboratory.* Extension Professor BEHREND.

A course in pumps, rams, water systems, sewage disposal, and plumbing for rural homes. Shallow and deep well pumps of different types will be studied and old pumps repaired. Various types of water systems, such as the simple gravity, pneumatic, and hydro-pneumatic systems will be considered and a simple system supplying hot and cold water for kitchen and bathroom will be installed. With the actual construction of a single chamber septic tank such correlated work as building the forms, placing the concrete, laying out for the tank, etc., will be covered. The plumbing work will consist of a study of kinds of pipe, pipe friction, pipe fittings and fixtures, and the installation of a water system necessitating such work as pipe cutting, pipe fitting, cutting soil pipe, pouring soil pipe, joints, etc. An all-day field trip is planned that several farms may be visited, levels run, data collected, and suitable water systems planned for each.

The selection of tools, publications, bulletins, and laboratory material for teaching the work to high school classes will be discussed. Laboratory fee, \$2.

S 12. Gas Engines. Credit two hours. Lectures, T Th F, 10. *Marketing.* Laboratory, W F, 2-4:30. *Farm Mechanics Laboratory.* Extension Professor BEHREND.

A course in the principles and operation of gasoline and kerosene engines including the study of the parts of engines and their names; the sequence of the events in the cycle of operation, the exact time of occurrence of each event and the reasons for such timing; the auxiliary equipment of the engine including systems for fuel supply and carburettion, electric ignition, lubrication, governing, cooling; actual operation of engines, the adjustment of parts and detection and correction of troubles. Single cylinder engines will be used at first, the study of four cylinder engines being taken up if and when such study is warranted by the progress of the class in the work. Laboratory fee, \$2.

S 41. Farm Shop. Credit two hours. T Th, 2-4:30, and S, 8-1. *Farm Mechanics Laboratory.* Assistant Professor ROEHL.

A course for teachers of agriculture in farm carpentry and such correlated drawing as farmers may find helpful in their construction and repair work; selection and care of farm shop tools; tool grinding, saw filing, fitting handles, window repairing, and painting. Special consideration is given to preparing men to teach this work as a part of the vocational course in agriculture. Laboratory fee, \$3.

S 42. Farm Shop. Credit two hours. M W, 2-4:30, and S, 8-1. *Farm Mechanics Laboratory.* Assistant Professor ROEHL.

A course for teachers of agriculture in farm shop work including the following: harness repairing, rope work, farm blacksmithing. The farm blacksmithing work is confined mainly to such forge work as will aid in the repairing of farm machinery and in the shaping and tempering of cold chisels, punches, picks, harrow teeth, etc. Special attention is given to the selection of jobs, to the best methods of doing

these jobs, and to degrees of skill which should be attained in the performance of them. Students will be expected to demonstrate the performance of one such job. Laboratory fee, \$3.

RURAL SOCIAL ORGANIZATION

S 1. Social Problems of Rural Communities. Credit two hours. Daily except Sat., 8. *Roberts 292.* Professor SANDERSON.

The aim of this course is to give an acquaintance with the social problems of rural life. These problems are considered primarily as those of community institutions. The movements of population and the economic status of agriculture are discussed to establish a point of view for the consideration of such topics as the home, school, church, health, recreation, government, and maladjustments in rural life. All these problems are analyzed as belonging to communities, and their adjustment is approached from the standpoint of community activity. There is an attempt to connect the course with vital issues in rural life sufficiently that the student may be better prepared for service in rural communities.

S 4. Rural Leadership. Credit one hour. Prerequisite courses 1 and 8, or permission of instructor. W, 2-4 and one hour in the morning to be arranged. *East Roberts 3.* Professor SANDERSON.

A seminary course for the study of the psychology of rural leadership and the means for discovering and developing local leadership.

S 5. The Rural Community. Credit two hours. A seminary course primarily for graduate students. Prerequisite course 1 and a course in general sociology. Daily except Sat., 10. *East Roberts 3.* Professor SANDERSON.

A detailed study of the nature of the rural community; its historical development; a comparative study of types of rural communities; their social psychology and the methods of community development and organization.

S 16. Recreational Leadership. Credit two hours. Daily except Sat., 9. *East Roberts 222.* Professor FELTON.

The aim of this course is to prepare students for recreational leadership in schools, granges, churches, and other community meetings. The following subjects will be considered: the educational value of play; the periods of childhood and their relation to a course of play and games; play as physical training; play for the development of social relations; play for the formation of habits and character; the place of play in the home; the home playroom and playyard; school playgrounds; community playgrounds; recreation in the program of the church; recreational programs for community halls; play days in rural schools; historical pageants and festivals; story telling; and amateur dramatics.

S 18. Rural Community Organization. Credit two hours. Prerequisite course 1. Daily except Sat., 8. *East Roberts 222.* Professor FELTON.

The aim of this course is to help rural teachers, school supervisors, county agents, and other rural leaders in the technique of organizing rural communities for unified, effective community service. Typical communities will be analyzed and discussed to arrive at the problems involved and their solution. The methods of local organization in successful communities will be studied. The programs of the grange, church, school, farm bureau, home bureau, cooperatives, lodges, and other social and economic institutions will be discussed and related to a unified community program.

S 19. The Rural Church. Credit one hour. Th, 2-4, and one hour in the morning to be arranged. *East Roberts 3.* Professor FELTON.

This course will consider the rural church as a social institution, its relation to other organizations and institutions of the rural community, and the objectives and program of work of the rural church.

S 20. Pageantry. Credit two hours. Daily except Sat., 10. *Home Economics 245.* Assistant Professor HUDSON.

This course and course 21 are designed to train local pageant leaders. Course 21 should also be taken by all those specializing in pageantry and dramatics. The course will consider the historical development of the pageant; modern pageants, their occasions, uses, and varieties; study of typical pageants; planning

and writing the pageant; organization of the group producing the pageant; grounds and stages; special problems of producing and staging; costuming, pageant acting, music, and dancing; a survey of the literature of that subject.

S 21. Practice Course in Pageantry. Open only to those who are taking course 20 or who have had its equivalent. Credit one hour. M W F, 2-4. *Roberts 131. Miss DUTHIE.*

Each student will be expected to write one or more pageants suitable for definite communities and occasions. Drill-work in reading of lines, acting, grouping, and rehearsing of pageant episodes. The work is designed to give practical training for pageant directors. Students will also participate in directing and acting in a pageant to be produced during the Summer School.

S 22. Dramatic Production. Credit two hours. Daily except Sat. Two sections, 9 and 11. *Goldwin Smith 26. Assistant Professor HULTZEN.*

The theory of stage direction; choice of plays, elements of training, staging; other practical phases of production, one-act plays rehearsed, practice with the summer theater company.

S 23. Introduction to the Study of Society. Credit two hours. Daily except Sat., 10. *GS 124. Professor BARNES.*

A survey of the geographic, biological, economic, and historical factors in social development.

VEGETABLE GARDENING

S 1. Vegetable Gardening. Credit one hour. Lectures, M W F, 8. *Poultry 174. Laboratory, F, 9-12 or 2-5. Vegetable Greenhouses and Gardens.* Assistant Professor SCHNECK.

This is an introductory course in home vegetable gardening and school gardening, of value to those interested in the teaching of vegetable gardening in secondary schools. The course consists of studies of the principles and practices of gardening as applied to the production, harvesting, and storing of vegetables.

Planning and management of the garden, seed and seed-handling, growing early plants, special requirements of the various vegetable crops, and insects and diseases will receive consideration. Laboratory exercises are planned to show application of principles discussed in the lectures. This course should be of aid to teachers of nature study and also to teachers in agricultural high schools.

S 2. Advanced Vegetable Gardening. Credit one hour. Lectures, T Th, 11. Laboratory, one field trip a week, time to be announced. *Poultry 174 and Vegetable Gardens.* Assistant Professor SCHNECK.

This course is intended for students who have had experience in vegetable production or handling and who desire to secure more knowledge of the scientific principles underlying the production and handling of vegetables.

The aim in this course is to show the application of fundamental sciences such as chemistry and botany to the production and handling of vegetables. It should be of special value to high school science teachers as a means of helping them to introduce scientific ideas to high school students in connection with vegetable gardening. It is also of value to students in home economics as a means of indicating the importance of vegetable food in the diet and the best methods of selecting and handling different kinds of vegetables for quality.

The field trips will be taken to the College gardens where experiments with vegetables will be studied and also to the best vegetable farms in the vicinity of Ithaca.

S 3. Systematic Vegetable Gardening. Credit one hour. Lectures and laboratories, M W, 2-5 or T Th, 2-5. *Vegetable Gardens, East Ithaca.* Assistant Professor SCHNECK.

This course should be of value to teachers of agricultural botany as well as to those interested in agricultural high school teaching.

Lectures on the origin, history, and taxonomy of vegetables; lectures and laboratory studies of different vegetable types and varieties; their characteristics and adaptability to different conditions. Important varieties of all the different vegetables are grown in the gardens, giving an abundance of material for study as well as for preparing and judging exhibits.

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